CREATIVE LEARNING AND TEACHING

HARRY LLOYD MILLER

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CREATIVE LEARNING AND TEACHING

BY HARRY LLOYD MILLER

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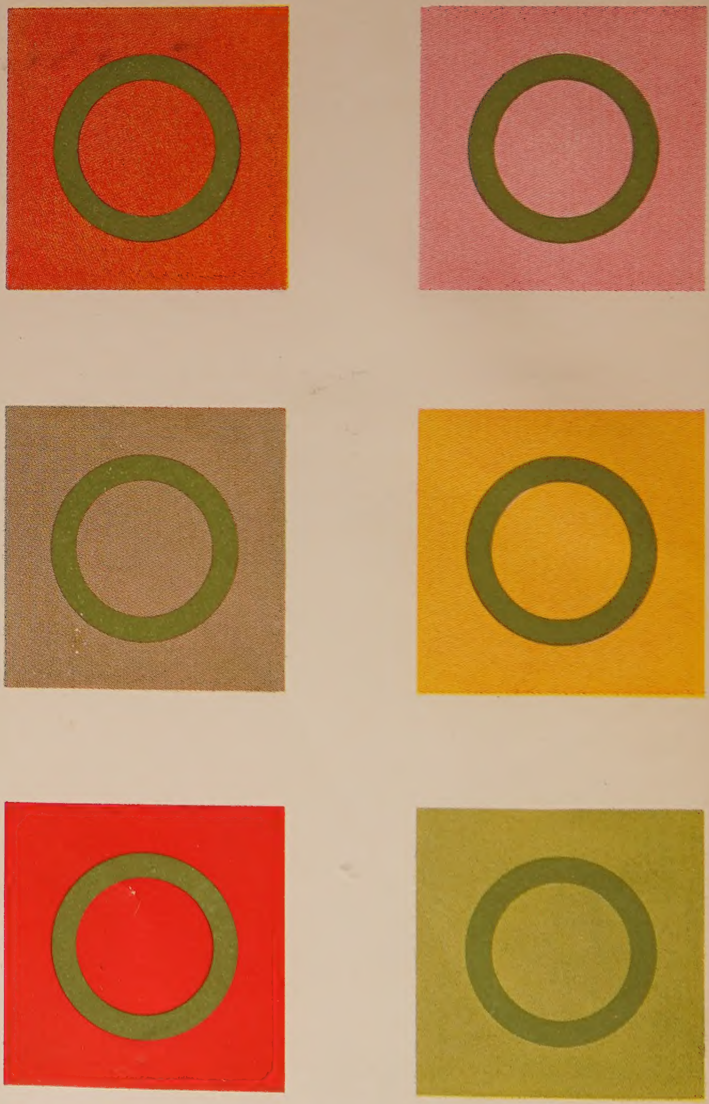

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CREATIVE LEARNING AND TEACHING

BY

HARRY LLOYD MILLER
Professor of Education and Principal of the Wisconsin High School
University of Wisconsin

WITH

INTRODUCTION BY GLENN FRANK
President, University of Wisconsin

CHARLES SCRIBNER'S SONS
NEW YORK CHICAGO BOSTON
ATLANTA SAN FRANCISCO
DALLAS

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INTRODUCTION

I do not want to spoil a good book by a garrulous introduction. I want only to say why I think Mr. Miller's pioneering procedures are significant.

For generations we spent most of our time thinking about what should or should not be included in the curriculum. We were the docile slaves of subject-matter. The question that everywhere buzzed through the corridors of educational conventions was: What shall we teach? And then one day we began to think that maybe the most important thing was not what we were teaching but how we were teaching it. The concern of educators began to shift a bit from the content of the curriculum to the methods of teaching.

This new interest in the methods of teaching ushered in an era of experiment in education. We found new and better ways of teaching reading, spelling, arithmetic, and so on. The presses were kept busy with a lush crop of text-books of the new methodology.

The methodizers played gad-fly to the old-timers who were content to be merely retail merchants of canned information. The methodizers were riding high. The world was theirs. And then—as happens too seldom—a still newer group of educators arose to play gad-fly to the methodizers.

Mr. Miller belongs to this second generation of gad-flies. His significance lies not so much in his illuminating criticism of the old education which was the merchandizing of subject-matter, as in his deliberate effort to reform the reformers. He sees that much of recent educational reform has done little more than to improve the merchandizing methods of the old education, that it has left teaching as a task of conveying organized information to students, despite its improvement of the conveying technique.

Mr. Miller belongs to the growing group of educators who think we need a new conception of teaching before we can devise the best possible methods of teaching.

He boldly shifts the emphasis from subject-matter to student. He sees education as the process by which the individual student discovers and develops himself. He recognizes the differences that exist between students without falling into the sterile and sinister business of herding students into barricaded pens of inferior and superior in a way that makes the one crestfallen and the other cocksure. He sees the fallacy of recognizing differences by sorting out the students and then, after they are sorted, ignoring differences by subjecting the students to standardized and crystallized lessons.

He does the one thing that seems to me to lie at the heart of education—he makes the teaching process take its cue from the learning process. Until day before yesterday, historically speaking, we made the learning process take its cue from the teaching process. Our schools have been organized for the benefit of the teachers instead of the students. That is to say, our whole teaching technique has followed the logical lines of the teacher's organization of the subject-matter in his field. Mr. Miller makes the teaching technique follow the psychological lines of the student's intellectual adventures.

The old teaching, save when redeemed by the individual classroom genius, produced either docile slaves or discontented rebels. Mr. Miller is prophet and producer of a new teaching that is producing creative citizens.

The Miller approach to the educational process promises to give us schools in which there will be more learning and less teaching. He is showing us both by what he is doing and by what he is saying that the teacher's first duty is to keep out of the student's way and that his highest function is to serve as stimulator and guide in the learning process. Under Mr. Miller's leadership the teacher ceases to be a mere clerk in the storeroom of accumulated knowledge.

GLENN FRANK.

UNIVERSITY OF WISCONSIN,
MADISON, WISCONSIN.

CONTENTS

PAGE

INTRODUCTION BY GLENN FRANK v

CHAPTER

I. BUILDING CREATIVE UNITS OF LEARNING . 1

II. INTEGRATING UNITS OF LEARNING . . . 51

III. BLAZING A TRAIL FOR CREATIVE AND INQUIRING EDUCATION 117

IV. DISCOVERING THE INDIVIDUAL 173

V. TESTING, A CONSTRUCTIVE CRITICISM . . 221

SUMMARIZING EXCERPTS 249

INDEX 255

CREATIVE LEARNING AND TEACHING

CHAPTER I

BUILDING CREATIVE UNITS OF LEARNING

(THE CONTRACT PLAN IN ITS FIRST INTENTION)

The individual must find a way of discovering himself in a self-realizing process, if the democratic temper is to be exemplified. We have sought to lay the foundation for a procedure in which differences may be recognized. Exploratory and orientation courses have become familiar catchwords. The real problem centers in the attitude maintained toward the individual. If the individual is regarded as a cog in the machine, the danger is that education will be reduced to a preparation for some ulterior purpose. The tendency is to think in the old terms of classification and to employ those phrases which aptly described the different social strata in another social order. It is easy to speak and write of "those who" are to be the hewers of wood and the drawers of water, and of "those who" are destined to be the leaders, and "those who" are to be the followers. If we are to have "orientation" courses, we ought to be concerned about some definite program of *orienting the orienters* themselves. Their philosophy will need to be scrutinized. There can be no doubt about the wisdom of seeking ways of self-exploration and self-orientation.

Likemindedness and similarities are never to be regarded as common bases from which to start or common goals to be attained. No objection is urged against *achieving* similarities in the sense of unifying our ideals through self-active contacts in emancipating programs. We have indicated little patience with doctrines which propose to select individuals for careers. Rather, the view is stoutly defended that self-appraising in the light of the facts attainable must be the process, at all costs. It is not possible to judge in advance of the journey. Some pioneering has been done in clearing the field, in subduing the land, for this democratic opportunity. The stumps of tradition are not all blown up. It will be necessary to cut out the water sprouts shooting up from the old roots of yesterday's flourishing growth of branching customs.

Two systems of life are in constant clash. On the one hand, the majesty of plan and precision dominates life. No one will fail to appreciate our marvelous technology. The drive for standardization and organization has revealed man's conquest of nature forces. An age of force and steel appeals to the imagination. Typical of this conquest is an innocent little postage stamp on a properly labelled bit of paper. A powerful material civilization has made possible an enormous amount of cooperation in a world fast becoming a solid industrial unit. The machine is welding the nations into the greater community. There is always another note in this unfolding drama. It is the good life. It is the art of living abundantly. It is not enough to save human labor. Human life must be saved in the process and made beautiful. In contrast with the genius for organization is the disposition to follow no cut-and-dried system, but to find a way of coordinating and unifying many forms of free experimentation in which the moral hazard is taken. A system of life is envisaged in which distinctions are clearly drawn between budgets at one end of the scale and poetry at the other extreme. For after all, life, guided by intelligence, must have a chance to feel its way and be guaranteed a system of behavior which insures growth along the line of successful experimentation.

Fr. De Hovre in his *German and English Education* (a comparative study) has presented a striking contrast between two systems of life. One is bounded by and rooted in the nation. The national principle is dominant. State absolutism subordinates the individual. Indoctrination is a method which secures the State. All tradition ministers to the State. Highly centralized control is stressed. Pedagogy is synonomous with methodology. Education is above all else intellectual culture. The individual gets his value from the State. Systematization, methodology, organization, efficiency, completeness, thoroughness marked German education prior to 1918. In the English tradition, individual liberty moves into the center of interest. "Social life is the high school of

English education." Character stands above intellectual activity. State control means state-intervention. The corporate life is a valuable training-ground for "Good manners." The human principle replaces the national principle. All that intriguing array of words compounded with *self* is introduced—self-discipline, self-knowledge, self-control, self-realization, self-respect, self-culture, self-development, self-activity.

"The knowledge ideal makes the teacher an artisan; the character ideal makes him an artist." The strength of one system lies in organization; the strength of the other lies in the emphasis on bed-rock principles designed to protect personality. It is interesting to note, in passing, that both Germany and England are modifying their systems of education (and of life as well) by adapting the best features of each system, one to the other. Dr. Fr. W. Foerster, Professor of Education at the University of Munich, condemned the German conception of education on moral grounds and advocated before the war the incorporation of the fundamental principles of English education. The Fisher bill in England was a notable achievement, not alone in its wealth of human hopes for the care of the adolescent, but also in the strong features of the German system projected in its elaborate provisions for central organization. Emphasis on organization tends to reduce the individual to an everlasting minor. Methodology superimposed produces docility and obedience. England has looked at education from the personal point of view.

Respect for form must not trench on respect for freedom. It is difficult to effect a reconciliation of these two opposing systems. Only compromises have been made.

In one system standardized results have their place in dealing with all manner of uniformities and mediocrities. In the other system distinctions will be drawn between budgets and music. The system which looks to vast organization got itself superimposed on our American ideals and expresses itself in the doctrines and practices of the classificationists in education. All programs and curricula designed to select and place individuals with respect to positions in the social order belong to a rigid system which serves the ends of groups holding power. The situation has been described in Chapter III (p. 181) in the surviving forms of status. It is common today to hear vocational fortune tellers fixing (academically at least) the destinies of persons gummed and labelled for this and that outcome.

We have presented briefly a severe contrast between two systems of life. Neither alone is satisfactory. Compromises between them are awkward solutions. A third approach is defended. It is expressed in such paradoxical statements as *liberty under the law, freedom in work.* Freedom or liberty alone degenerates into license. Emphasis on the *law*, or *work*, or *authority* alone overshadows the very quality so urgently sought in that long drive for personal liberty and individual responsibility. Discipline for its own sake is not the solution. That method always leaves in its wake people finished in docility or aroused to incipient rebellion. No one has formulated this third approach better than Bertrand Russell in *Education and The Good Life.* The new discipline is to be like that of the football captain and the leader of the orchestra—a discipline that is *voluntarily* suffered by all the members of the group in the effort to secure cooperative results. Authority and obedience are merged in a flowing stream in a functional unity, where no one commands for the sake of commanding and no one is subordinated by legalism. *Freedom in work* and *liberty under the law* may be conceived to be a third system of life, and may become a basis for a new philosophy of education, and then a *modus vivendi* which will suggest a liberating technique for the schoolrooms of the land.

A little sketch will serve to point a moral and adorn a tale. The early career of Sir Edwin Arnold, famous poet and savant, was marked by an alluring teaching experience. One day as headmaster of a school while taking a stroll, a lad across the hedge spoke to him, saying, "I am called a dunce, but I am not a fool." The lad had been classified and tagged. He had reached the fifth proposition in Euclid, the isosceles triangle, and it was for him the *pons asinorum* (the bridge of donkeys). Sir Edwin sat down with the boy and used the isosceles triangle as a figure merely to talk about other matters. After restoring confidence in this boy in the little episode, something was said about the fifth proposition. Sir Edwin remarked: "Are you going to let that old baldheaded mathematician of Alexandria lick you?" Pretty soon the boy said, "Oh, I see it." Some years afterward Sir Edwin was traveling in Canada. At the approach of a very remarkable bridge across a mighty river he noticed a large isosceles triangle displayed, bearing the legend, MY FIRST BRIDGE. The master engineering feat was the bridge across the stream. A tablet on it bore the inscription, MY SECOND BRIDGE. The lad was Tompkins, who became the famous bridge-building engineer. Somehow in that spirit we mean to carry on, regardless of the protest that democracy is a thing infirm and a thing that lacks efficiency. Tompkins was labelled a dunce, but he was not a fool.

The practice that is now becoming prevalent is foolish when it comes to excusing boys and girls from any pursuits merely because they encounter difficulties. The whole business of curriculum making today and the choices students are encouraged to make should command the most searching scrutiny. There is something tremendously significant in those "first bridges."

We have suggested the notion of a scale from budgets to poetry. Perhaps at the middle of a hundred items geometry could be placed (remembering, to be sure, that phases of geometry distribute themselves throughout the register). Then looking out in one direction from the middle position toward budgets one could safely urge that standardization should be progressively applied until budgets and other metrical things are reached. And looking in the other direction toward music, poetry, and appreciation, one might urge that progressively less and less standardization should be applied, reaching very quickly the point where it cannot be applied at all. There is tragic muddling here. The boy in the lineage referred to above who was placed very early in life with a group of older boys made a significant contribution to education in an examination designed to discover whether he might remain with the older boys. One question was framed to elicit from the examinees some interpretation of those twenty-three lines in Portia's speech, "The quality of mercy is not strained," etc. The question asked was: Paraphrase these lines from Portia's speech. The boy wrote for his reaction these words: *I hope no one of the forty-eight in this class will have the impiety to try it.* For that answer, the boy was invited to remain in the class along with Huxley and Spencer and Darwin, though himself much younger.

On the Art of Reading, Quiller-Couch has elaborated this point of view. How can any one examine on *that?*

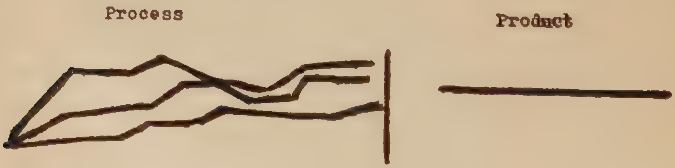
> He has outsoared the shadow of our night;
> Envy and calumny and hate and pain,
> And that unrest which men miscall delight,
> Can touch him not and torture not again.

What you can do is to request the candidate to write a short note on the word *calumny* above or to ask from what it is derived, and you can ask him to quote any parallel allusion in Byron. "But you are not getting in measurable distance of *it*" by any such didactic methods. We need to know when to put our fingers on our lips and refuse to tell what we know as teachers; and we need also to know when not to enquire into some of those intimate personal matters lying in the areas about one end of the scale mentioned above. Standardized methods have their place and undoubted value. The great teacher knows where to draw the line.

As teachers and administrators we need constantly to renew our loyalty to the profession in the confidence that boys and girls *are* what they *may become*. We recognize the complexities of this age into which we are plunged. What pupils *do* is one thing; what they *can* do and *will* do under stimulating and awakening education is another thing. We would remind ourselves of the dangers of accepting results in teaching when minds are going along unchallenged. We realize the fact that substitutes for old standards have been made. The widespread American habit of "getting by" is affecting deeply the ideals and practices of our schools. Prudence has been substituted for righteousness. The disposition to accept a negative principle of conduct insinuates itself into our institutions when our people learn so readily "what they cannot get by with." A new renaissance is expected. The appeal of realization in fine thinking, in wholesome emotion, in research magnificent, in creative education, in healthful recreation, and the like will quicken the imagination of teachers and promote education by participation.

The negative approach to our problem is easily stated. Now that the field is cleared for a new adventure, a single sentence is enough to raise the issue. *The daily "lesson" must go.* It fits nobody. All the paraphernalia of pedagogy fabricated to negotiate the "lesson" must go. The practice of setting up an undifferentiated object, called the average mind, in front of which the customary motions of teaching are performed, however systematically, must go. A clean sweep will have to be made. A working group will be substituted for the conventional class organization. *Units of learning, comprehensive in their nature, will be substituted for "lessons."* The shift of emphasis is perfectly definite.

If a broken line is drawn and above it is written the word *Process* and then the line is continued with a heavy bar separating the two parts, and the other side labelled *Product,* we shall get from the picture a start in the new direction by way of antithesis. Different lines are pursued in the processes of arriving at a similar product. The three broken lines are supposed to represent the paths three different pupils might trace in arriving at a given result. No two pupils will travel identical roads. The roads are built in the process.



We have been delivering the product to our students in the forms of ready-made conclusions, printed pages, formulated truth, lectures, lessons, "moving" pictures, slides, laws, and the like. A vast *structure* of learning has been developed and stereotyped. The student is now to be started in the processes by which these products are achieved and by modes of participation enter into a creative significance. Diagnosis of processes will supersede criticism of finished products. *Directing study* will take the place of hearing lessons recited and any form of supervised study which the lesson-hearing school has found palliative. In technique the teacher will be concerned mainly with the pupils' habits of study, and he will seek to make productive the activity of boys and girls in a class hour characterized by the work-spirit. More and more the pupil will be guided in the appraisal of his own product. Self-criticism will be far more significant than teacher-criticism. An error the pupil is stimulated to discover in his own work will be valued far above a hundred canonized mistakes listed by the teacher under the *rain* and the *reign* of red ink. No longer will teachers be found examining the *finished* product of their students and rejoicing over student failure. Criticising and scolding will give way to refreshing forms of guidance in the pursuit of central ideas. The spectacle of the recitation in which a half-dozen pupils hold up hands apparently eager to recite and in the same class a half-dozen or more not engaging in that form of physical exercise will also pass. The shift of emphasis calls for a new technique.

Failures and mistakes will not be used to confirm bad habits. Guidance in the *creative* will take the place of testing the *accretive*. It is the chance to make one's own appraisal that furnishes the basis of growth in intelligence. *Pupil power* will have the right of way over *teacher talk*. To guide mental life and to stimulate curiosity are vital in any true education.

We are prepared now to take up the argument elaborated in the third chapter and discover certain *guide lines* which will serve to illustrate a plan of securing two aims in every significant learning unit: (1) unifying principles, (2) differentials to minister to individual differences.

We may start with a subject so prosaic as spelling. Under the influence of factory methods a tendency has developed in the direction of making language a means of communication. The mania for minimum word-lists and for practical words determined by usage has sacrificed the creative side of word-building. Nothing seems quite so absurd as the effort to standardize such things. A new word ought to be a way of looking at life. A new word suggests a new way of making friends, a way of establishing a new set of relations, new habits and interests. Uniformity is a hopeless goal in any creative technique. Why should any group (or grade) of children be required to learn a certain list of words as a "lesson," or set upon a half-dozen spelling demons, or expected to acquire a given vocabulary? Any fifth or sixth grade class-group may start with such a word as *automobile*, and they may be challenged to go out and find all the words in the kingdom which that word, incorporated into our life, has made possible. Within three or four days a thousand words will be gathered in. No two pupils will find the same words. Each pupil is guided by the *automobile idea.* Each searches as he wills and makes his own discoveries. The cooperative efforts of the group result in a word-list of far-reaching significance. Some motivation may be in order. The main thing is to provide for *motive* in our discussions of motivation. So frequently the motive is lacking. The automobile, one might say, has divided us between the quick and the dead. It has changed the meaning of old words. *Pedestrian* no longer means one who walks, but one who runs and jumps. A new word significantly incorporated into our life is truly a way of living.

Families of words furnish excellent examples of comprehensive units of learning which may become creative challenges for pupils. A teacher got started in this new adventure by presenting a few words out of our new creative chemistry. Rayon and artificial silks, it was suggested, would soon be worn, and it might make a difference in our mentality on account of the fact that these new synthetic products are more permeable to ultra-violet rays than our woolens, silks, and cottons. Sulphides are phosphorescent and it may be but a few years when they can be produced cheaply enough to be used on our walls. They re-emit light absorbed during the day. Women will soon be clothed in wood and dyed in coal. Just enough of this sort of thing may be done to arouse curiosity and stimulate enthusiasm for the challenge. Out they go searching the magazines for these new products. The pupils are looking for words, but they are gaining far more than a mere spelling of words in an assignment.

A teacher in the rural school long years ago records an experience yielding similar results. The big boys and girls of the country district came to school year after year with little thought of promotion. If the teacher was able to manage them, they stayed. If not, they would dispose of the teacher, and retire peacefully only to repeat the experience the next year with a new teacher. The gang was there loyally cooperating in the making of mischief. The new teacher came. He challenged them. He gave out a little hint about *facio* and dared them to find a hundred words derived from that old Latin stem, *fac*. Three or four days afterward the teacher called for a report. The leader of the gang apprised him that they were not ready to report. On the following Monday the leader volunteered. How many words? "Four hundred and fifty-two" was the reply. "Well, how did you do it?" said this schoolmaster. "It was this way. We got to looking into the dictionary and decided the best way to do it was just to divide it up and assign each member of the gang a definite part of the dictionary. It was done." These boys demonstrated capacity for cooperation in something besides mischief. Needless to remark, that schoolmaster stayed.

In these three little word-sketches, set out as challenges, we have the essence of the *Contract Plan* in its first intention. *No upper limit* for any pupil in the group replaces the *limited* and *limiting* lesson-assignment. *For any minimal essential of content a richly diversified maximum of content within guiding common multiples is provided.* No pupil is held back on account of another. No pupil is pushed forward within the challenge at a rate that baffles and discourages.

Four fundamental impulses are readily discoverable in the procedure. (1) There is laid down or incorporated in the human species a sort of "hunting pattern" which may be dignified by calling it a research pattern. It appears very early. The desire to search into, to look into, to pry into, to see what lies over the hills and round the corner is a primary impulse or pattern. The desire to know is basic in our lives. We are curious. "Idle curiosity" may get the better of us, but without it the land of intelligence will not be discovered. In these sketches the impulse to search out new words operates in the swing out on new frontiers. The procedure is peculiarly adapted to pupils in the earlier years. There is a place for it in the junior high school. Radio, electricity, and the like suggest at once cores of interests which may be creatively acquired by getting the "hunting pattern" into action.

(2) Searching must not be in vain. The rewards and satisfactions that come through discovery are the warp and woof of mastery. The little child, playing the games of hide-and-seek, hide the thimble,

or any activity involving the chance of hitting upon some unexpected result, finds in his discovery the highest elation and his most abundant life. Those hidden words which he finds by searching have a peculiar value for him. *He* has found them. It is self-discovery. No finer work can be done than that of providing a "practicing-ground" for possible and realizable discoveries. There is just as much realness in "Let's pretend," as in the more prosaic "bread-and-butter" aims. It is well to study the hurdles. There is no fun in making low hurdles all the day. A sense of achievement gives verve and stamina.

(3) After searching and discovery, including a sense of mastery, there is the desire for recognition. The desire for recognition manifests itself in various ways. Often protective coloration is acquired. There may be no boasting and yet an inner enhancement of self-esteem that is unmistakable. A quiet sense of mastery may become a racial characteristic. The desire for recognition suggests a proper basis for the development of social traits in a "shared life." Individuality has been defined as capacity to enter into relations. *Differences, and not similarities, make possible the corporate life.* The specialist learns how to make his contribution to the whole and how to see the whole through his special contribution. In these studies of words in family groupings, each pupil is a specialist. Each one brings his findings to the discussion table and integrates what he finds with the contributions of others. In this process of intermingling a true and a genuine *socialization* is

emerging. The sharing of differences in a purposive whole cultivates self-respect. It is highly important that each pupil shall have a chance to contribute a unique result, a word no one else has discovered. That is the road to self-respect, as well as to self-reverence and self-knowledge and also the method of socialization. There is much confusion on this point. Going through the formal motions of a "socialized" recitation will miss true socialization as often as it is tried.

(4) The demand for a sense of security is also fundamental in any good life. If the old formulas and standards fail us, some moorings must be found in our adventuring. It would seem to us that a vital sense of security in a changing order may be had only by participating in the new world. The ancient walls cannot be supported long. New engines are absolutely essential. The old walls may be used in the building of new roads. The materials may not be lost. They will be changed and will escape recognition, if participation in the change is lacking. The new sense of security is not to be found in charts made by authoritative and prescriptive methods. Only by appreciating the need of a compass and by using it with fine courage will it ever be possible to live by realization. The challenge is, to become a participant and not to remain a spectator. A sense of security in a changing society ought to be cultivated. It can never be attained by remaining outside the adventure. Neither teachers nor journalists are ever going to be made by writing notes on some

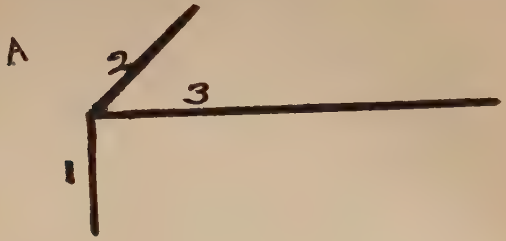
performances observed from the bleachers. Only by participation is the new point of view to be appreciated.

What a dreary business it is to send pupils to their geographies to learn the names of the peninsulas, capes, and rivers with a view to reciting on them *with the books closed*, when with a little imagination these continents might become living creatures with inviting adventurers to listen to the stories they are eager to tell! The river has a gripping geological story to tell and one can almost hear it saying: Come, let me tell you of my origin, my journey to the sea, my ancient history, my continuing work. The map of Spain (or any other patch of color) invites you, boys and girls, to examine the pigments that went into the making of a living reality. A magic story lies hidden there in Old Spain. It ties up with the brilliant achievements of Taj Mahal and the Alhambra. The Christians married the Moors and all *that* runs through the patch of color, called on the map, Spain. Every land is asking you, boys and girls, to listen to a wonderful story. One might start the new challenge (the *Contract way*) with Robinson's search-light question: How did I (the map of Spain) get that way? How did I come to be bounded by the Pyrenees and by Portugal? My geography will tell how my people "got that way."

The practical difficulty appears at once. Unless there is a definitely bounded area so obviously marked off that minds devoid of imagination will know precisely what to do and precisely what motions are requisite in the performance of the specific task, the objection will be raised that neither teacher nor pupils will know what to do, nor will the latter care enough to do anything significant or fruitful. There are two principles or possibilities which should be gripped. The principle of unification (or unifying) —some common guide line or multiple—should be clearly presented. This principle may not be appreciated until work is well begun—until a genuine sense of mastery is beginning to emerge. The other principle may seem to run to diffusion. It may operate unproductively if the meaning of individuality is confused with individualism. What we must keep clear is the variety of patterns which a single unifying principle guarantees. The patterns, the individual achievements of pupils which are wrought within the organizing and unifying principles (or hypotheses), are not identical. There should be no disposition consciously to achieve similarities beyond the partial resemblances which the same principles produce when attached to pretty much the same ideas.

It is exceedingly difficult to find an illustration which appears to exemplify these two principles (unity and variety) in a moving synthesis. The following illustration was resorted to, though not elaborated, in *The Self-Directed School.* We are carrying that device through a half-dozen stages with a suggestion that the reader substitute for *guide lines* some ideas or principles or hypotheses germane to one's own special field and to see the patterns (the evolutions and creations) in each case as applications of these central ideas (guide lines).

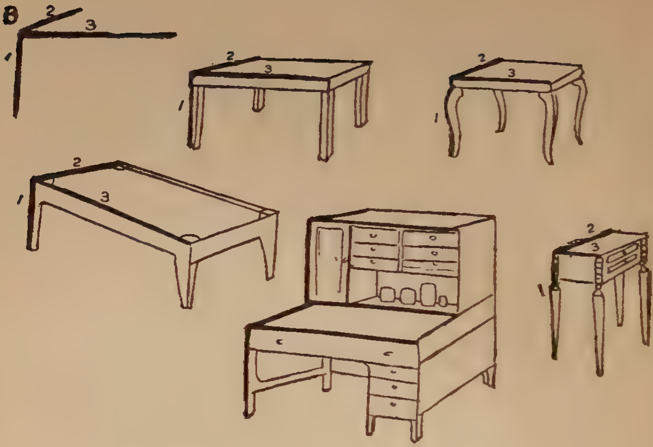
Three lines are presented in some such manner as they appear in figure *A*. There is no fiction about these lines. They are called key lines by the artist. They are used in the courses in Drawing. We are naming them *guide lines* and suggesting that they be thought of as an *hypothesis*—something to think with, something to create with, something by which each pupil in a group working forward under *Directing Study* may make his own patterns, with no upper limit as to the distance he may go in working out for himself applications of the hypothesis. The procedure is fairly simple though not obvious. Let the teacher in initiating the new challenge (contract) draw the guide lines on the board in some such manner as to suggest the making of a table. It is understood that each pupil is at his easel now. Materials are at hand for working forward creatively. Imitation is the last word in stupid pedagogy in this procedure. The *artist* teacher finds a way of stimulating mental life. Ideas precede "concrete"



performance. The idea of table must be created in the mind of the pupil *as* he begins to work (play in the true sense) with these lines. The teacher suggests that lines be drawn *in relation* to these lines, parallel in this case, starting at the ends of 2 and 3. The teacher is careful to give the pupils a chance to move before drawing illustrative lines, although no hard and fast rules are to be followed. The main thing to do is to assist the pupil along the line of development illustrated in the next series of pictures. If a pupil, baffled at first, makes a stroke out of which comes to him the flash of illumination, a notable achievement has been scored. As the creative worker moves along in the production of such an array of patterns (below), emphasis on "seeing in imagination" what he is about to represent in his drawing should not be lost sight of. If *idea* is used as a verb it will suggest a principle of guidance. Try to *idea* a table before you draw it.

B represents a series of patterns produced by one pupil. A variety of patterns is to be expected. There is no upper limit set for any one working forward. No two series need be identical. Unity is evident throughout. The heavy guide lines are common, yet not identical. Such is the essential nature of all true guide lines, all hypotheses, all principles.

In *C* the guide lines are modified within the control of the conceptualization of *chair*. By modifying the angles and the direction of the lines, designs of many sorts are invented. Industry offers a pe-


B
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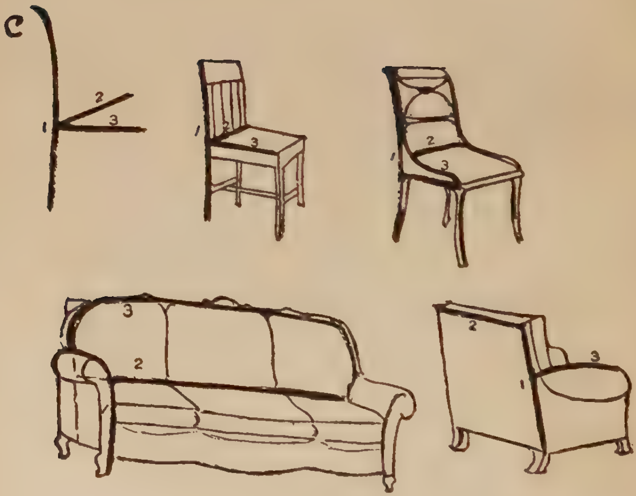
C
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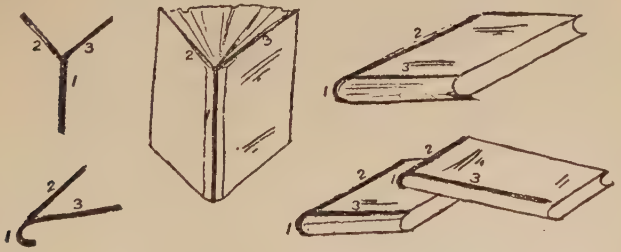
culiar opportunity for this type of analysis. The mind has been emancipated in the creation of new designs. A "model" chair is an anachronism. There is no "model" hat for women, because women are interested. Novelty is working here to bring about an amazing result in all forms of industry and fashion. The endless creation of a future is suggested in the pursuit of these guide lines. Again there is no upper limit to the *chair idea.* No member of the class group should feel that he has finished a task. The ideal is to start a creative principle and to work with it for a time in the hope that it may be incorporated into life. The law of satisfaction is exemplified in a process of realization, in the joy of producing a unique pattern, in the discovery of some creative significance.

D.

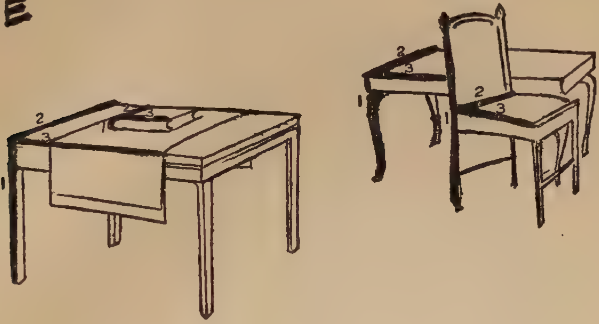


D represents another series worked out by a pupil now being liberated and finding a release of power in self-expression. A pencil stroke from the ends of the guide lines suggests *book.* It is a valid observation to say that ideas grow out of drawing lines (sometimes at random) in relation to the guide lines. No hard and fast lines are being drawn. Ideas and action are in no sense being separated. The series suggests growing possibilities and new levels of relations.

Still higher levels are illustrated in *E* below. A suggestion merely is all that is needed to initiate a combination of the preceding patterns. Subjects of the curriculum, we find, are full of combinations of "fundaments" by which higher eduction relations are established (p. 160). The mathematician finds a happy reference at once in such challenges as: Find all the points which are equidistant from two intersecting lines and also a given distance from a given point. That language of telegraphic brevity is thought to be too difficult for a vast majority of high school pupils. A saner view is to look into the possibilities of an integrated *Contract* in which simple relations are made the foundation of creative mastery, and then take the responsibility for guiding pupils in terms of an organization of the challenge that provides a way of creative thinking and achieving.

New ideas are included in *E*. The problem is one of establishing relations in the second order, as it were, or just the notion of combining and recombining elements that may not present a great deal of difficulty when standing apart. Teachers know that pupils may be trained to see relatively simple relations, and yet become utterly confused when it comes to bringing together old elements in a new situation. Geometry is full of such situations. A beginner may have an apparent mastery of a simple element and be unable to move with any sign of intelligence when a simple "known" element gets itself involved in a new combination of lines and angles. It is this power to educe relations that should be cultivated. We have been seeking to bring this new adventure into the focus throughout the discussion. The old business of filling the mind with "bonds," that is, the business of instruction by indoctrination methods, fails to provide a practicing ground for this challenging creative procedure. We are using this extended analysis of guide lines to make emphatic the shift from methods of information (methods of filling, emitting, forgetting) to those procedures in which the mind is actively working forward under its own power within the guidance of a principle. The principles (the guide lines) provide the bases for unity, and at the same time promote a

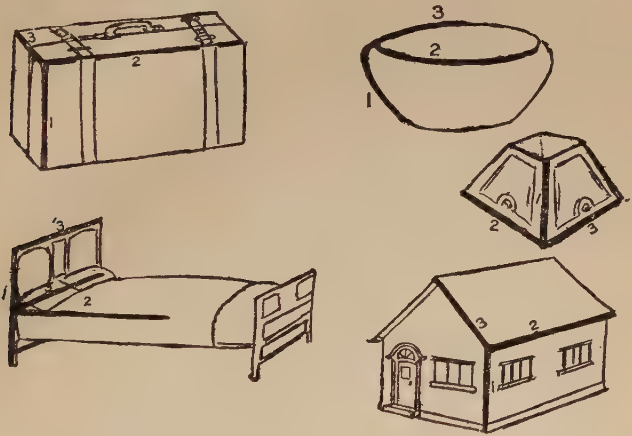
E



richly diversified curriculum in which each individual is tempted to work out his own patterns with a gleam always opening for him alluring possibilities of new discoveries.

F is included to suggest a further *freedom in work.* The *guide lines* are still in evidence. Any pattern below will be appreciated by every member of the group. The unifying principle makes possible a functional basis of cooperation. In any class group, however selected, there will arise the need of making provision *in teaching* for wide ranges of individual differences. *F*, below, is a series of patterns made by one pupil moving well out on the frontiers of the challenge (the contract). It represents to us vividly the desirability of extending the challenge. Literally we are urging that their lines shall go out to the ends of the earth. Minds emancipated will find a new sense of security in the realization that the *lines* will not be impoverished thereby. *No upper limit* for any pupil, working within the general circle described, is a phrase we need to get into action and attach it to a teaching verb that will have no equivocal meaning. No pupil is denied a full and realizable opportunity. No pupil is held back (within the challenge) on account of another; no pupil is rushed forward (through the challenge) for the purpose of covering the ground. Each works in every wholesome way up to his best capacity. *Pupils are not segregated; their work is constantly integrated.* Differences are expected. Differences promote a true unity through shared experiences. A basis is laid for the recognition of moral principles. Genuine reactions are clearly distinguished. What the pupil produces on his own account is appreciated and appraised in the processes of education.

F



We are not interested in this illustration in exhibiting finished products. There are certain abiding principles carried throughout the discussion. One of the most difficult concepts we shall find confronting the new teacher is the proposition of judging pupils by discrimination rather than by classification. Provision for some recognition of individual flair is difficult to make in the old systems which find their reliance in group mediocrities, similarities, and standardized results. Mastery is an annoying factor. What does it mean? In these pictures, progressively created, one might ask: Where do you propose to cut the sequence? Is there a point where there is just no mastery at all? The boy makes a drawing. What is to be the criterion by which to judge it? Does not the difficulty lie in this confusion over process and product? Would it simplify the problem to assert that the *drawing is making the boy?* When has a person mastered swimming? Is it when she can sustain herself in the elements with a stroke that enables her to keep her nostrils out of the water, or is it mastery when "She swims like a dolphin"? At present, we are interested in shifting the emphasis from the prevailing examination of the product over to the processes, knowing full well that the shift will make a vital difference in the consideration of all such moot questions as mastery, understanding, appreciation.

In the "set-up" (through the guide lines) of the *Contract Idea* in its first intention, the lesson stereotype, the recitation method, the examination habit are all challenged. Pupils are not assigned "lessons" in the usual manner. Recitations are not conducted in the customary ways. Examinations will come to have a totally different purpose from that of determining what marks shall be recorded. The procedure is definitely opposed to the methods of the lesson-hearing school.

If not a lesson every day and the familiar motions connected therewith, what is to be done? A *unit of learning* is to be substituted. It ought to be, in so far as possible, a comprehensive and creative unit in which a genuine and fruitful recognition of individual differences may be realized. This new unit should not be handed down by methods of indoctrination. It should never be regarded as a finished product to be delivered to the minds of students. If we are to think of the *Contract Plan* as an extended assignment, or a glorified "lesson," or a body of organized subject-matter to be transferred from book, lecture, or laboratory to the receptive minds of students, it were better never to try it. There is nothing to be gained by any alleged economies in assignment if the contract is approached as a body of material to be learned and recited with certain modifications in the old formalisms. There has grown up an unfortunate implication in the use of the word *contract.* It is the practice of handing out the whole contract ready-made. Not infrequently the term has been used as a verb. Pupils have been required to contract to do so much work on the basis of which school marks were to be issued. Both tendencies are to be especially condemned, if there is a disposition to regard the contracts as uninteresting chores to be grudgingly performed. Such tendencies tie up with the conventional practices of the recitation system.

The time element is an important consideration. How many days should be allocated to a contract? The answer is definite. *Make the time factor flexible.* It is conceivable that a genuine short unit might require only a day. A week, more or less, might be regarded as a safe beginning in projecting a contract.

There are units that will require four to six weeks. It is desirable, as a rule, to break the larger units into phases in order that the time factor may be controlled. What we would escape is any stereotype such as a period of one week highly formalized within the Monday-Friday span. When we have decided upon a unit and the probable time to be devoted to it, conditions will arise to modify details. A day or so added or subtracted will be perfectly legitimate. One advantage of the *Contract Plan* is the opportunity it offers to delete lock-step methods and any objectionable forms of regimentation. There will be no need of apprehension where there is *freedom in work* (leaving no doubt about either work or freedom). A *contract* which proves stimulating and fruitful may be continued a few days beyond the time contemplated in the general survey. It will be another stupid achievement if teachers are instructed through ready-made courses of study "to cover the ground" by the clock. No two class groups will be identical. Differences should be met with intelligence and courage. The plan must not be superimposed. It will be desirable to present a general scheme for the year's work. It will be highly important to look ahead and develop a sense of direction and proportion along with a sense of values. Only, however, by regarding all systems of advice, all manuals of instruction as a compass, will it ever be possible to catch the spirit of the *Contract Plan*. Each teacher and class will make their own charts. Method will be immanent, self-originating, constant, and pragmatic. Teacher and pupils by participation contribute the social forces of control, direction, and associated management. Stereotype procedure can never be applied. Each subject calls for special technique. The technique varies in the same subject. Teachers, happily, are not struck off from the same "model." Individuality has a chance to operate in the plan proposed.

An interesting thing is happening in connection with the experiment. Wherever it is being tried requests come pouring in for sample contracts. There is no disposition to complain about the phenomenon. It is a good thing to send out suggestive materials. What needs to be understood is the obvious fact that the finished product is never to be delivered to teachers or pupils. The samples sent out represent the achievements of a working group. They should be looked upon as charts made by using some guide lines as a compass. It would be another unfortunate chapter in "pedagoguese" to have established a sort of Sears-and-Roebuck distributing house from which ready-made *contracts* could be ordered at so much per gross.

In the light of the *guide-line* discussion above in which the idea of extension was illustrated in graphic terms, and in the light of some comments thought to be pertinent, the following analysis of the procedure used in a *unit of work* may prove suggestive. It is not presented as a "model" to be followed. That would be anathema. There could be no objection to using the three major movements which seem to us to be universal, but general only in the meaning of a compass.

A class in Social Studies began a new contract, *Prohibition*, with the expectation of pursuing it for one week. The staff teacher and principal had spent a little time projecting the general technique to be employed. Three major movements were set out.

1. *Problem-Raising Movement.*
2. *Directing-Study Movement.**
3. *Organizing, Unifying Movement.*

Upon a careful survey of the Herbartian five formal steps, familiar to all students of education, and the five stages developed by Morrison in his illuminating book, *The Practice of Teaching in the Secondary School*, it was concluded that the three movements just cited would serve admirably the purposes sought in the *Prohibition* challenge, and in general a fruitful method in any contract whatsoever.

The thing to do, it appeared, was to make a tentative distribution of the time which was to be given to the contract. On the basis of five days, sixty-minute class periods, *and no prohibition on home study*, the following division of the time in class was projected.

1. *Problem-raising*—15 to 20 minutes.
2. *Directing-Study*—approximately 3½ days.
3. *Organizing* (*unifying*)—1 day.

It turned out that two days were given to the third movement. It took on the form of two splendid debates. So we see, at the start, that a week of five days was precisely not that at all, but six days, and it might have been seven days had they not rested after the sixth.

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* A restricted use of the term—*Directing-Study*. Its wider meaning includes all phases of the new procedure.

The new contract, *Prohibition*, was announced at the beginning of the hour on the first day. There is no rule about this matter. The point is, no previous assignment had been made on this contract. The pupils may not have known it was coming. We are not to infer that they are never to know what is coming next. They began at once and some twenty minutes were devoted to *problem-raising*, the object being to intrigue interest, to stimulate enthusiasm, to kindle the imagination, to *orient* the pupils to the challenge—in brief, to get started.

This *Problem-raising movement* should not be confused with the term, *overview*. Frankly, we are a bit shy on that word. In practice it too often means that the teacher presents the very ideas and facts which the pupils should discover for themselves. There is danger of destroying the "practicing-ground" for creative thinking and vital challenge. Soft pedagogy plays havoc in the business comprised within the steps of "preparation" and "presentation." An inordinate emphasis is placed on them. The mischief is done by teachers talking these two steps before pupils, expecting them to learn the "lessons" or "contracts." The steps of "comparison," "generalization," and "application" are hardly touched at all. Any attempt to dress up a day's lesson in five formal steps, or any other sacred number, leads inevitably to undue emphasis on form for its own sake. If we are not wise and very clever in the overview, we will miss the mainsprings of action of boys and girls and leave them sterile and indifferent. We are tempted constantly to use the word *challenge* instead of contract just for the purpose of keeping the focus upon the individual as a self-realizing, self-discovering worker.

In the *Problem-raising movement* the teacher seeks to present a challenge. From the teacher's point of view the new unit of work is a sort of *prescribed temptation.* The brief period of twenty minutes is not to be devoted to teacher-talk and some ethical injunctions, nor to that much-abused, much-written-about term called motivation. By judicious questioning a good start may be made. "*Prohibition*, boys and girls! Have you any suggestions, convictions, or ideas about it?" Up jumps a little girl, displaying the fervor of an evangel. "I think people ought to have their personal liberty . . ." (And you know what her father thinks about the business.) Something is doing. Others are on their feet, *pro* and *con.* It would be easy to spend the hour in chattering on personal liberty. "Is there any other angle to the question of *Prohibition?*" A boy whose father's political faith may not be in doubt rises to the bait. "I think it was a big mistake for the national government to undertake the control of the liquor traffic." These are merely hints to indicate a possible direction. Out of this ferment two guide lines emerge. The teacher sees to it that they are written under the first movement.

1. *Problem-Raising Movement*

GUIDE LINES:

(*a*) INDIVIDUAL LIBERTY VERSUS SOCIAL CONSTRAINT.

(*b*) NATIONAL CONTROL VERSUS STATE RIGHTS.

The guide lines are (*a*) and (*b*). They constitute the organizing principles by which intelligent study of the contract is to be launched and guided. These two guide lines are the *common essentials* in the challenge. A remark may have been made about each in the first movement. In fact, a youngster did puncture the argument of the defenders of "personal liberty" by pointing to practices in sanitation, control of epidemics, traffic regulations. "We don't do as we please in such matters, do we?" We are ready at this stage, after casting up the guide lines, to begin the second movement, *Directing-Study*. (These guide lines may not always appear as early in the contract. Frequently they may not begin to clarify until the pupils are well under way in the second movement.)

The guide line for us all in the first movement is to be perfectly clear about the need of developing a problem consciousness, a problem-solving attitude. Teachers and pupils should never be denied this fundamental proposition. It is the leavening principle in all creative work. Without it learning degenerates into a mechanical business in which the petty immoralities of discipline arise and a pride in status develops. One may properly urge that without a problem there is no thinking. The brevity of the problem-raising period should not operate to depreciate the significance of a good start in a real challenge. Frequently a question is enough to produce a flash of illumination and give bite to the challenge. It was done in one class by a search-light question: What kind of world would we have today if the marvelous Faraday had not made his contribution? (Referring to electromagnetism.) That was enough to turn on the ignition, and every boy and girl began turning on the power in new transmissions ahead. The question will arise: Is it always possible to start with a problem, with a searching question? Is it not necessary in some units to heave to and learn the dull stuff by sheer drive of will-power? Ordinarily, that type of question is raised in connection with the doctrine of acquiring a certain body of facts or tools before thinking is deemed possible. Even so, Harper could fire the imagination of his students, year after year, by starting with "*In the beginning*." When asked how many times he had started with that first sentence of Genesis, he replied that he had used it at least one hundred times. When asked what he did when he had no enthusiasm for it, he replied with lightning speed, "I create it."

An important consideration (one of the vital parts of the new minimum essentials) is a forward-looking teacher acquiring a sense of the organization of materials caught up in tempting and challenging forms. To have fussed a brief spell in the first movement and then to have dropped into a conventionalized assignment in which police duty is done in mechanically negotiated supervised-study periods will institute no essential reforms. If there is only a single book available a serious handicap arises at once. There are units of work in other subjects in which a single text is used. Yet in exercises in arithmetic or grammar we shall find in the next chapter the ways of flexibility and full release of powers. The teacher in the unit of work under consideration had provided abundant material and references for study. The search was begun in the first period the first day.

The *Directing-Study movement* may be characterized, in general, as a period of individualization. The claims for individualized instruction, quite familiar to students of education, will be satisfied in this movement. Some phase of the problem of *Prohibition* is to be attacked by each pupil. It is not essential that all should begin reading identical material. The choices pupils make within the challenge will be approved. Guidance and suggestion will not be lacking. Possible lines of study will be written on the board. The main preoccupation of each pupil in this first class period is to get started in the adventure. It may be a good start to have come to a decision about some problem to be pursued. Or it may be a fine thing to have gone a little farther in selecting a few references upon one's own problem or phase of the *unit of work*. At all events, the class period closes on the first day of the challenge with the central idea in motion, made more clear and more securely gripped by every member of the class. A free field ahead has been surveyed and trails marked a little way for the new prospectors. The guide lines are thrown out. They are to be used as a compass is used in the making of individual charts. A unity is assured, never a uniformity. Every chart that is produced will have a direct bearing on the central problem. A basis is laid for interrelating and sharing various contributions. No upper limit is prescribed for any member of the group, either by setting a minimum or by prohibition of home study. No pupil is limited to a single phase of the unit of work. Stimulation to a mere quantitative production will be avoided. Opportunities for enrichment will be cultivated.

Approximately three days are still available to devote to the *Directing-Study movement* in the contract on *Prohibition.* If the contract is extended over a period of two weeks the time for this movement is more than doubled. It is extremely important therefore to examine the principles which shall govern the technique of this movement. It will be a difficult movement to interpret. Individualization has been suggested as a fitting term by which to characterize this movement. All isolationist dogmas should be deleted from its meaning. It is easy to superimpose the mechanical formalisms of the lesson-hearing school (relieved by supervised study) on the *Contract Plan* or any other mode of education designed to liberate potentiality. The pupil is often isolated and directed to work alone for a long period of so-called directed study. The interpretation we desire to present may be illuminated by studying an orchestra in action. Each player has a unique part in the symphony. The analogy is not far-fetched. The team work of a football squad is suggestive. That analogy ought not to be despised. Each player occupies a strategic position in the game. Each contributes to the whole. The work of the guard differs from that of the man at center, yet each player's activity is merged in the unity of action. The actions of the individual players are not reducible to mechanical units which may be aggregated in a total. All that misses the point in team work, in playing the game. Individuality is John's difference meeting William's difference and straightaway streaming forth to meet Henry's difference and so on, until differences find a synthesis in emerging unities by and through participation.

The first caution to be observed is to understand that individualism is not implied. The pupil is not to be isolated, as it were, and expected to turn out "doable" things in the contract while the teacher spends his time three to six days (six or seven days in a challenge of two weeks) checking *all* the work each individual turns in for correction and criticism. There will be considerable laboratory work during this movement in which the teacher will acquire a capacity to guide mental life productively, and to keep an unobtrusive grip on the work and activity of every member of the class. It is well to make emphatic at the start that the teacher may not be expected to check all the work each pupil produces. As noted above (p. 11), the teacher is finding the center of his activity (a *modus operandi*) in diagnosis of processes and in remedial measures, calculated to assist the pupil in building for himself fruitful habits of study. The pupil as we have explained is to learn the art of criticising his own productions in the light and under the control of our common guide-line principles. The teacher is concerned with the problem of directing thought in terms of central ideas.

The second day of this contract included activities of the following nature. The teacher spent some twenty to thirty minutes at the desk going over the work of each pupil. The pupil brought his notes or note-book to the desk for suggestion and tentative checking. A brief conference was had with each pupil. The main thing to be achieved is to stimulate, to encourage, to challenge, to direct as the situation with each pupil suggests. For most of the pupils just a word of approval was appropriate. While this procedure was on, everybody was at work on his own problem. Conference of this sort bears no earmarks of punishment. There is opportunity to fecundate the intellectual life of all the pupils, not merely those baffled souls who under the older mechanical methods sit and stare, ox-like, difficulties out of countenance. The procedure reminds one of the pianist referred to (p. 130) who calls each pupil to the piano to play a short selection upon the basis of the rendering of which helpful suggestions are offered. This part of the hour is not to be stereotyped. During the conference session the teacher may run into difficulties common to a large number. He will step to the board and ask those who need special assistance to come with him. A brief discussion or explanation suffices. Some pupil may be found who has not started. He will need specific direction. Jim, in this experiment, has been corrupted to the roots. He was bearing the sorrowful burden of schooling lightly. Explanations he regarded as innocent ethical injunctions never meant for him, of course. Jim would be gently led to a book or bulletin and told to indulge himself in the perusal of it and to be ready to report the next day when he might be required to regurgitate what he was exposed to in a written test at the board or at his desk. Before the second day is over, the teacher may call for a half-dozen oral reports from the boys and girls, a procedure intended again to stimulate interest in the challenge and to set "standards" of emulation in a sort of intellectual game in which sportsmanship has a chance to operate. During the second day out in this adventure on *Prohibition* a little time may be spent in discussing some issues in terms of the two guide lines, or the teacher, himself, may spend a few minutes demonstrating to the boys and girls his way of thinking with the guide lines in handling a specific bit of material such as the *Literary Digest* might suggest. At the end of the second day the challenge should be well under way. Every member of the group should be working intelligently into some phase of the contract. All should be vividly aware of the available resources (the materials at hand) with which to establish some understanding of the principles or central idea of the contract.

The third day is a further process of individualization. The ranges of possibilities should begin to appear on the horizon. (More on this point in Chapter II.) The lines of investigation and reading are now rather clearly set forth. The class hour will be mainly a work period in which deliberate relatings of individual work will be promoted, foreshadowing the debate which is in the offing as a closing episode in the challenge. Some productive partnerships should begin to form. The teacher suggested that Mary, Susie, and Harry, who started their study of *Prohibition* by going into the history of the liquor business as it was handled in Kansas, Iowa, and Maine prior to the days of the Volstead Act, get together as a group, compare their findings, and possibly form the nucleus of a group of debaters in defense of State rights. Dick and Tom had made an academic trip to Canada to survey the situation there. They are ready to get their findings together and to enter upon the task of boiling it down and making it a little thicker to discover, if possible, a principle of guidance that might prove interesting to the whole group. These are merely hints as to procedure. Another aspect of the third day out is that of testing for mastery. That important function of the second movement may be begun as early as the third day. The board should be used freely. Some pupils are ready to step to the board and write a brief of some reference read with care. A defensive argument arising out of some application or other of the guide lines may be written in part on the board. The teacher scrutinizes such work. It is there in sight of all members of the group. A significant contribution may be made the occasion for calling all members of the class to think on it; or some pupil not getting on well may be directed to go to the board and read to himself the productions of others who are overtaking the idea and expressing what they think in good form. The practice of sharing results in this manner cultivates a healthy disposition to measure up and excel. Questions may arise. A brief discussion may ensue. The thing of primary importance is to have fine results given publicity during the second movement. It may not be punctuated with teacher praise. (So often teacher praise is injudicious.) The effect of fine workmanship permeates the life of the group. The subtle suggestion in it acts as a tonic in creating opinion. The third day is well over. The processes of relating and of initial testing for mastery and understanding are begun. The teacher has been active in checking results, in guiding study, in acting as a consulting expert, and in general management of pupils at work in various forms. It would be perfectly easy to describe what the new teacher is not doing in this stage of the second movement. He is not hearing lessons recited. He is not talking too much. He is not sitting at his desk looking over post mortems (examination papers of dead yesterdays). He is not criticising the finished product of the pupils except in so far as testing for mastery is begun. He is not doing police duty in a mechanically driven type of supervised study. This negative description does not imply that mistakes and errors are given no attention. It does not mean that a student producing meagrely is permitted to remain *too* comfortable in his complacency. The day is peculiarly a work period. Quiet application may characterize the major part of the hour. It may be the quiet hum of industry, but no time for either teacher or pupil to take a siesta. The lazy, mechanically minded teacher will retire from the game. The talking teacher will indulge in pedagogical chattering, making it quite impossible for any productive work to be done. All of these suggestions are intended to be partial descriptions of a varied procedure, the details of which can never be catalogued.

We are prepared for the fourth day in the procedure. Testing for mastery, begun the preceding day, will be elaborated. It will not be highly regimented in the form of the usual examination, although there will be occasions when pupils will write strenuously for a solid hour. In general, it seems wise to get this phase of the whole movement (testing for mastery) out of the way before entering upon the third movement, the stage of *unifying* and *organizing*. Occasionally the teacher himself can afford to jump in with the boys and girls in healthy rivalry, such as writing on the board an exercise (a demonstration of a proposition or exercise in mathematics). It is a wholesome thing to do. A youngster who can compete with his teacher in the performance will bring to the profession a new attitude toward scholarship by emphasis on the companionship of the intellectual life. There are many ways of testing for mastery. A brief test often suffices. Partnership work is sometimes intriguing. Two pupils may recite to each other verbs of the same conjugation and the like.

Much will be done on the fourth day in the *Directing-Study movement* toward preparation for the debate now taking form for the last day of the contract. It will be ideally a day when the guide lines are taking on color and significance in terms of a projected goal which has been formulated out of the procedure, and which is always strongly suggested in the "set-up" of the guide lines early in the first or second movement. One of the finest functions of the teacher in this fourth day out is the guidance of pupils in their preliminary organization of materials for the projected debate. In this phase of the contract there appear the elements of an excellent project cooperatively developed. Preparation for a debate, for dramatization, for competitive group reports, for a "spell-down," for a final exhibition of skill elicits the best from boys and girls eager to win. The day is not spent in examining pupils to find out how much they have learned or to discover what mistakes they are able to record. The new type of testing for mastery will be directed toward those activities which are designed to aid pupils in using the guide lines. Provoking and promoting thought in terms of principles will occupy the center of the field of testing rather than a testing for the retention of information. On this fourth day results are checked, compared, and sifted, in a preliminary way. Difficulties are cleared up. Some discussion will arise. But it is not a day for formal recitation, formal examination, or any stereotyped procedure. It may be a day mainly devoted to further search and individualized and group help. It may be a continuation essentially of the work described for the third day. If the contract is a longer one covering a period of two weeks, the latter part of the *Directing-Study movement* will incorporate many additional features. Many phases of group work within the class will be discussed in Chapter II. For example: Here are four or five pupils who need special attention. They gather about the teacher's desk or in a corner of the room and their needs are ministered to in a snappy explanation, demonstration, or discussion in which they alone are concerned for the time being. The teacher is in their midst testing them for mastery and clear thinking and intelligent response. The most brilliant pupils are given extraordinary opportunities by a similar technique. They are called to a special group to have a new trail opened. It may be a very difficult problem not included in the text or a proposition related to the contract but so difficult that only one in a thousand may master it. It is a good thing to send out the challenge and let them struggle with it.

We have not attempted to describe in detail the movement we are designating, *Directing-Study*. Only a few suggestions have been made. It would be utterly confusing to try to include the charts that have been made in the procedure. It would be absurd to try to annotate every shift of wind which a ship about to set sail might encounter.

The last stage, the *Organizing movement*, has been anticipated. Many plans of individualized instruction stop with goals attained by pupils. The work is checked off and the contract is finished. If individualization characterizes the preceding movement, that good word *socialization* might be used, though much abused as it is, to characterize this third movement. Socialization is not to be set over against individualization. In fact, these two big words are phases of an emerging unity, the front and reverse sides of the same coin. In the contract under consideration, the last day was devoted to a spirited debate. Everybody participated. Every pupil in the group was arrayed on one side or the other on the question tied and tangled in the first guide line—personal liberty. Three debaters in a try-out as a part of the second movement, done outside of class under the self-direction of each group, were chosen. They were the speakers. Each pupil assumed a definite responsibility in the debate. It was interesting to see a pupil write a note for his side, take it up to the table, and have it incorporated in the main speech or the rebuttal. One lad had found the report of Fisher's study of liquor consumption, in which it was held that the people of this country are consuming only about ten per cent of the amount consumed in the days of the open saloon. The boy kept it up his intellectual sleeve until his side was ready for the final blow in the rebuttal, when he stole up to his best debater who sprung it as a surprise and won the debate.

We have been emphasizing the movement for specialization. It is impossible to check it in our modern life. What seems possible now is a simplification through the discovery of some emerging unities that will gather up these special contributions and make for understanding of the whole through a sharing of the findings of the individual researching within the guidance of common principles. Debate, discussion, dramatization, partnerships, project demonstrations, exhibition of workmanship, snappy recitation work, cooperative group presentations are suggestive forms of this organizing movement. The sharing of results is the basic idea in this day's work. It turned out that an extra day was given to the *Prohibition* contract. A debate was arranged in terms of the second guide line, and we heard about Hamilton, Calhoun, and other outstanding exponents of the National and the Staterights principles.

Different subjects have their own moods. Special techniques are always in the making. In this third movement, the conclusion of the matter in an *Art* class would be a display of the productions and a study of them, perhaps a scoring of them, or some appraisal to bring out pupil self-criticism of their own work. In mathematics the contract might culminate in a spirited demonstration of board work in which speed and accuracy, and a searching gripping of principles are emphasized. It is amazing to see what can be done in one of the *organizing*, *unifying* days when every pupil is "on his mark" doing his part in a cooperative drive for a comprehensive result. The activity may resemble the old-fashioned recitation. The point to be made clear is the fact that the last day or two of the contract is a culminating movement, and that pupils have worked up something which they may recite superbly. They see relations in perspective.

We are suggesting that testing be made an incidental factor in this last movement, although a new attitude may be created toward the examination in which a fine sense of joyous self-expression is possible. The purpose in the suggestion bears upon the proposition that one does not find a joyous and a productive release of creative power, if criticism is constantly injected. It is difficult for a child to read freely and well, if he is being frequently reminded of his mistakes. If the boy feels pretty certain that he is going to be asked some question about the subjunctive mode before he gets going in a bit of oral reading, he will be likely to stumble along with growing inhibitions. This last movement is not to be entered upon with abandon. Rather the emphasis should be laid upon the artistic side, and an effort should be made to assist the struggling speaker, the amateur demonstrator, to free his energies. The principle appears to be sound. It is not a case of trying to say something with nothing to say. The contract has been pursued. The pupils have worked up something and are prepared to present it with some degree of assurance and with varying degrees of skill. The central idea should have the right of way. Details will not be omitted; but first things will come first. After the central purpose of the third movement has been attained, a written examination may be utilized as one means of securing responsible self-expression.

The discussion, thus far, has been designed to set forth an introduction to the next chapter. The foundation, as it were, has been laid. An attitude, not altogether hostile, we hope, has been created toward the *Contract Plan*, or better toward the challenge plan (still better toward the challenge idea). A new general procedure has been projected. The best in other procedures will be included in a moving synthesis which squares with a new set of ideas. The shift of emphasis has been definitely presented. Differences and not similarities are held to be the pragmatic basis of unity. With these principles in the background we are prepared for a new adventure —a definite program in which provision is made *in teaching* for individual differences.

CHAPTER II

INTEGRATING UNITS OF LEARNING

(THE CONTRACT PLAN IN ITS SECOND INTENTION)

We have surveyed the situation with respect to the individual, and we have come to the conclusion that differences can not be classified *out*. Whenever similarity in one direction is established, further investigation discloses marked divergencies in other directions. Moreover, the basis of our philosophy suggests the possibility of seeing the individual in the *process of becoming*, and this attitude resolves itself into a principle of action in dealing with boys and girls. A progressive self-realization is the only tenable position in the light of the facts. Each individual is expected to make an increasingly intelligent use of his environment in a self-discovering process. We have not sought ways of artificial and arbitrary modes of classification, nor are we disposed to minimize the importance of organization. The aim is to provide productive forms of coordinating and unifying differences without limiting or destroying opportunities for individuality. The larger *Unit of Learning* (comprehensive, unified, and significant) has been substituted in our thesis for the uniform lesson-assignment with its accumulated mass of formalism in terms of methodology.

Now the problem arises: What technique may we employ to provide for individual differences in teaching? No two individuals are alike. "Sectioning by ability" fails to iron out differences. The small school can not resort to "homogeneous" grouping. The elective principle in curriculum making introduces insuperable difficulties in effecting practical programs of grouping by "ability" standards. The facts in the business are that any class group, however brought together, will present the problem of making provision for individual differences in a more or less acute form.

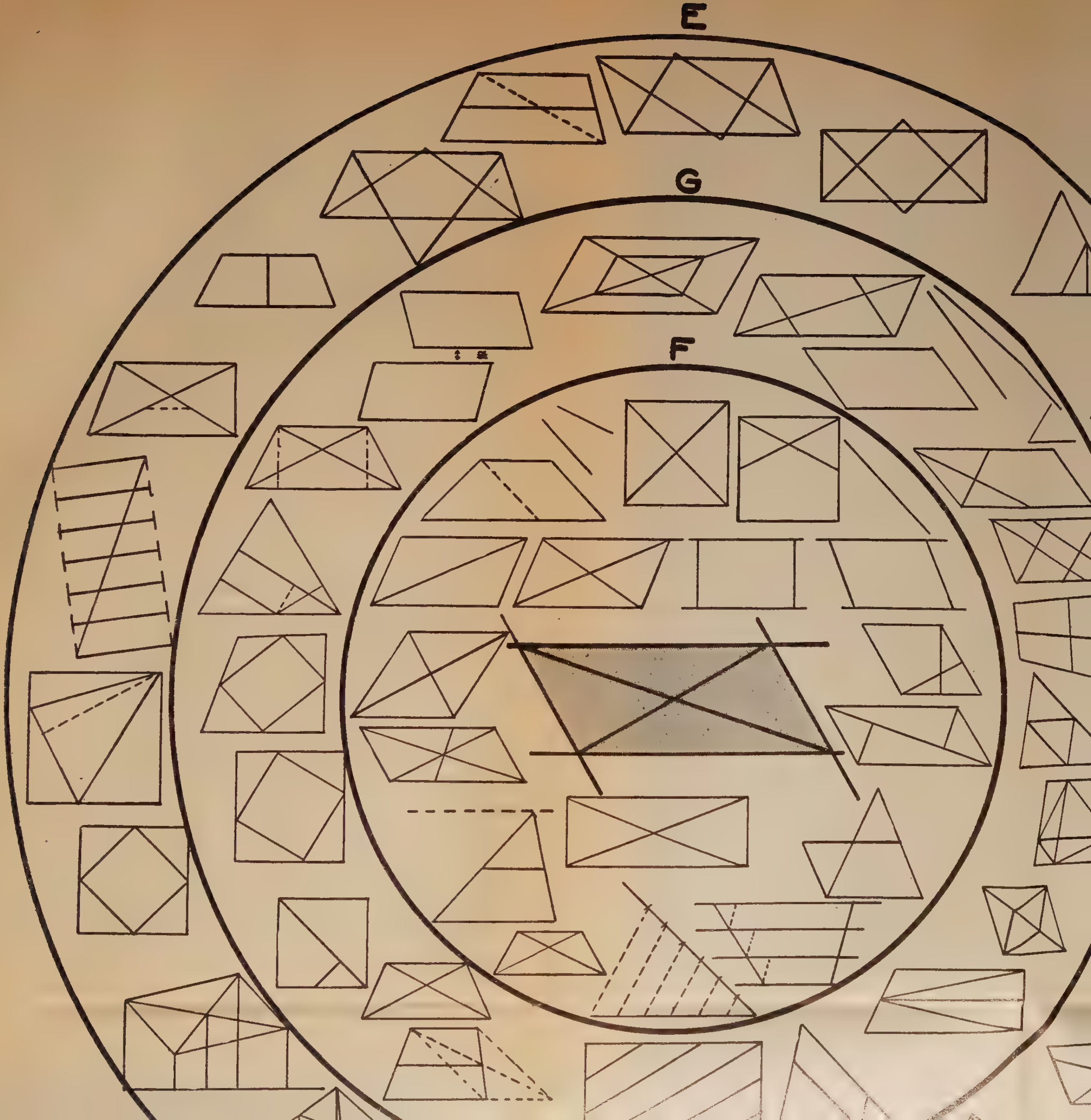
The first approach in the technique under consideration is concerned with a functional reorganization of subject-matter. The *Unit of Learning*, the contract, is to be integrated. Much can be accomplished by an academic study of the problem. In order to get the issue before us, an integrated contract on three levels is submitted. The illustration, it will be remembered, comes at the end of an adventure, not at the beginning. It represents one of the "finished products" arrived at by a working group. It is not to be accepted in its final form as a chart to be superimposed upon any class. Teachers may find it highly suggestive, but even the same subject-matter as that comprised within this integrated contract, may assume a similar but not an identical arrangement in a new situation.

A, in the insert, is a completed, integrated contract in mathematics; one of the patterns worked up by a fifteen-year-old boy and presented to his class group as his judgment of the relations that should obtain in the arrangement of the materials of the contract.

We are proceeding in the analysis of this illustrative contract in the order opposite to that in which it is created. We desire to make it perfectly clear that we start in practice, not with elaborate contracts completed and organized with all the varied elements set down in black and white; we begin at the center with some guide-line principles, as a rule, and build these structures, such as this one, by a coöperative and progressive procedure in which every pupil has a chance to make a contribution. There are occasions when we start not with guide lines but with experimental data and work up through guided experience toward the discovery of principles and central ideas.

But first an analysis of a formulated product. The chart (and it is a chart made by using a compass) presents three concentric circles. Three concentric squares may be used quite as satisfactorily. The circle is an excellent figure. In order to create the conception, it is well to start the *Contract Plan* in its second intention by drawing three concentric circles. The first essential principle to be gripped may be illustrated by resorting to Huxley's suggestion. Throw a pebble in a pool and the wave goes out. With that information any student can tell what "goes out." It's the wave that goes out. Is it a motion that goes out? Well, we are not interested in settling that problem. We may say that individual particles or drops of water are disturbed, agitated as the wave goes out. The analogy is suggestive, if not carried too far. The wave is likened unto a principle, a central idea that may go out disturbing individuals differently at different points in ever-widening circles. There is no upper limit. The wave, to be sure, becomes more and more highly attenuated. The analogy is only suggestive. It is not intended to be a rigid figure at all.

There is a valid reason for three circles. Our system of school marks strongly suggests a three-level arrangement. A deeper analysis, however, will suggest a psychological basis for some two or three level differentiation. Reasoning by contrast up through similarity and difference requires a high type of mental effort. It is mainly for this latter reason that we are suggesting the diagram. But there is a practical consideration involved in the question of school marks. We may desire to abolish all differentials and resort to a procedure that has in it "satisfactory mastery" or "no mastery," and there by be done with such variations as now appear in the marking scale. Such may be in store in a millennial era not so far distant. In the meantime, we are proposing a practical procedure through the organization of materials of creative learning for a differentiation. Out to the limits of the inner circle with a mastery we are saying a mark of *Fair* will be earned. Out to the limits of the second a mark of *Good*, and out to the limits of the third circle a mark of *Excellent* will be earned. There will be all sorts of overlapping. These circles will shade into each other.


E
G
F

There will not be just three artificial marks. In this design above, the boy found on his report card *E* (Excellent) with a little phrase attached, *summa cum laude*. His work was so well done that a recognition of his effort was nicely expressed in this old phrase. A mark of *G*+ or *G*−, and so on, is legitimate in our judgment. Three standardized marks would be a reflection of three standardized mediocrities—a situation we are seeking to escape. On this particular point, a teacher found a way out in a system where only three passing marks were allowed—*A*, *B*, and *C*. Her solution was recorded in the size of the letter. If the pupil did a very good bit of work on the *C* level, she wrote a large *C;* if another made a poor showing on that level, a small *c* was entered. A successful teacher will not be without a sense of humor. We shall return subsequently to the question of rating pupils in terms of achievement marks.

Next in the analysis of the finished contract, cited above, the central figure will arrest attention. Whether we start with the principles or guide lines, or take a brief time in inductive experimentation to discover the organizing principles in a new contract, it is important to note that at the center appears an idea, a dynamic principle, which becomes the pulsating core of the entire contract on all three levels. The parallelogram in the illustration is that pulsating core. It is the heart of the contract. It beats throughout the challenge. The pulse is felt in every item, in every member of the contract. Not a single figure in the array can be thought through with a sense of mastery and understanding without that living energy flowing out from the center. To be sure, lessons could be learned on these separate figures. Proofs could be memorized and recited and readily forgotten. There is little hope of mastery and appreciation by any such procedure. Just to see an integrating array of the materials of a contract in a graphic representation suggests a binding thread of relation running through the challenge. Ideally every contract will be capable of some such comparable representation. A linear presentation of material in running pages or sketchy outlines does not bring out the emphasis of relations and sequence and dependence as does the diagram of concentric circles. At the center, then, we shall seek to find that principle, or guide line, or hypothesis, or question, that will act, in a way, as the heart, as the pulsating core. Let us imagine a system of arteries and veins running out to all parts of the contract through which the life blood circulates. The unity of the contract may be envisaged in some such manner. It is absolutely essential that the *guide-line* principles shall be discovered. Creative and enquiring types of education can not be realized until such principles become for the learner a kind of creative technique by means of which he approaches the materials he will study in the challenge. We saw in Chapter I the rôle the key lines play in art. The theme in music is comparable. Two or three measures appear in the program announcement of a symphony orchestra. With those measures as a theme (as guide lines) a marvelous production is rendered. The theme is a thing to create with, in which and by which to express a wealth of variations, and with which to unify differences.

The principle at the center of the contract is a comprehending principle. A wealth of meaning gathers about that word, *comprehending*. Looking at the contract as a whole with a critical eye, one begins to see how every part of the contract is literally *comprehended* within a moving principle. In the chart the *parallelogram idea* permeates the entire field. There is no basis of understanding, of mastery, or of appreciation of any item in the contract, if this central principle is retired or in any manner ceases to function in the pursuit of the study of the contract. *This comprehending principle is the vital common essential.* The central idea is the common essential in the *Contract Plan.* The common essential does not consist of a quantitative body of materials of instruction. The confusion with content will be avoided, if we think of the wave that goes out, if we think of the hypothesis that gives meaning to a great variety of activities purposively organized about a common core, if we recall the guide-line principle set forth in the preceding chapter.

The attempt to establish a body of instructional content-material as a common heritage harks back to a social order in which the methods of indoctrination were used to insure a uniformity of belief and action. In all those systems the aim has been to insure a common belief and to devise a rigid method by which the "masses" of the "citizens" ("subjects") would know how to "think" on all vital issues concerning the national life. The dogma of indoctrination is still expressed in the mania for standardized results in education. What facts about our country could conceivably be regarded as an irreducible minimum by which a citizenry may learn to travel a safe and sound road in expressing relations in the Republic? Can it be done by assigning pages in censored books to be learned and recited (with the books closed)? Some of the methods employed in Americanization programs would seem to lend themselves to the inference that a full-orbed American citizen can be fabricated by injecting (by filling-station methods) labelled doses of subject-matter: four parts in a hundred allocated to the Declaration of Independence, ten parts to the Constitution of the United States, three parts to assorted dates in our history, about five parts to the inculcation of the standardized prejudices recorded against England, and the like. Obviously any such program is futile and superficial. It misses the genius of authentic Americanism (p. 181). We shall find a *vade mecum* by shifting the emphasis to common essentials in terms of the guide lines. The theme will be common. In the common multiple idea, a rich variety of patterns will be possible. It will be truly a "one-from-many" school and Nation. In the brilliant proposal of Walter Damrosch to have a lesson in music an hour a week in all the schools by radio in which Damrosch himself would be the teacher of 24,500,000 pupils (and as many parents and workers as may care to listen in), a common theme of the best music of the great artists would in three years, he believes, produce the greatest nation of music lovers on this planet. His beautiful English itself would validate the experiment. Contemplate the effect of having the little "red" school house and the palatial urban high school enjoying such "equality of opportunity"! That would be an ideal method of indoctrination.

We are urging some form of associated life as a guiding principle to be employed in every classroom situation. For what we do in our schools or fail to do in our schools will be reflected in the Nation. We may not know what social significance one subject or another of the curriculum will yield. No forward-looking educator will question the value of intelligent effort to appraise current practices with a view to ascertaining tangible outcomes of the study of any subject of the curriculum. We are prepared to be guided by the results of scientific investigation. No arm-chair philosophizing will stand up under the search-light of true science. After we find our "sign-posted" roads in curriculum provision (if such goals are ever to be defined in objective terms), we shall still have to be guided by a fundamental principle of *socialization*. Let us keep that good word. Whatever the curriculum material may be, whether Hebrew or Farm Accounting, failure stares us in the face if the *social* principle is deleted. Integration of differences is the key to a realization of the democratic social order. We are not indulging in prophecy. Yet we venture the prediction that when the new educational Moses, either alone or as chairman of a consultative committee, shall deliver to us the tables of authority on what to teach, we shall need to be reminded that procedure values lie at the center of our problem of education by and for individuality. A certified curriculum will result in a barren and a sterile cultural efficiency, if the social principle is disregarded.

The *Fair* contract, the materials comprised within the inner circle, should not be regarded as any glorified minimum essential. Any disposition to set that area apart as an irreducible minimum will miss the essential point in this adventure. These three levels of integrated work are not designed to meet the alleged needs of pupils "sectioned by ability" into *A*, *B*, *C* groups. If classes are selected and classified in that manner, we would strongly urge the challenge in its entirety for every group, even though the *C* section might not have in it a single pupil who would approach the limits of the outer circle. No doors are being closed at the beginning of the journey. The whole contract in its integrated form will stand out as an alluring "*prescribed temptation.*" We may not know what possibilities lie just ahead in dealing with any baffled youngster in the squab stage of adolescence. There is too much yet to be done in challenging unawakened intelligence to rest content with setting boundaries. A pupil whose record indicates that he may not rise above the *Fair* contract is not to be foreordained to a set level. He, too, is to have his chance under the guidance of free intelligence. The segregationists may be right, *and* they may be wrong. If they are wrong, they commit a grievous wrong. They will be compelled to study border-line cases. No criterion or standard can be administered with such accuracy as to enable the administrator to draw dead lines. If 75 is made the dividing line, some pupils just above that index belong with some of those just below. If the segregationist is going to be just *according to his own philosophy*, he must know who those are just above the dead line who should be classified with the *C* group, and also those just below who should be sent into the *B* section, else a manifest injustice is unintentionally perpetrated. That dead line is a shifting line. There are too many variables entering in to allow either the theory or the practice of the classificationists to go unchallenged. Any dead line set at 75, or any other index, should never be used in an absolute sense. At least 10 points on either side must be allowed for errors in method.

A free field ahead is the only alternative to a rigid system of organization in which the individual is moved about as a pawn at the will of another, expressed in either positive or negative methods of placement. Our contention is that the democratic temper makes no pretense of guaranteeing the future of any individual. There is no premise in a democratic social order that warrants anybody in believing that an individual adventure should be underwritten with a guarantee of success. The essential principle to bear in mind is expressed in the disposition to refrain from setting up closed circles from which certain individuals are excluded. It is a perversion of the democratic temper to attempt to *rope off* a limited area and then to seek ways of making guarantees to persons of alleged limitations. The open field presupposes the moral hazard. "Standards" are not to be lowered on account of failures. Failure, in itself, is not a tragedy. Has a boy failed because, forsooth, he stubs his toe and falls down? He has failed when he refuses to get up and do something about it. No consolation is being offered in this observation to ease the conscience of lazy, mechanically minded, irresponsible teachers who seem to rejoice in failures in their chosen subjects. Nor is there any desire to enhance the self-esteem of teachers mothering the curriculum with a touching devotion like unto that of the remnant of the Jews who sat down on the banks of the waters of Babylon and remembered Jerusalem for five hundred years. Insuperable hurdles need not be designed for the purpose of upholding an exclusive scholarship. A sense of continuing mastery in a clearly integrating sequence will not be deemed impractical once our teachers are emancipated from the control of sterile stereotypes and artificial barriers insinuating themselves into our traditional methodology.

Not until, and not unless, we discover ways of removing inhibitions and ways of releasing potentialities, is it safe to enter upon programs designed to fit the curriculum to unawakened and unchallenged intelligence. The all-pervading philosophy we desire to emphasize has some bearing on the creative side of development. The individual is not tracing a road already made for him; he is given every possible opportunity of tracing his own road as he goes. This position is not difficult to maintain or appreciate by those of us who are at the wheel, day after day, dealing with growing minds. The surprises are numerous enough to make the adventure an inspiriting one.

The inner circle may be roughly comparable to the level of "empirical concretes," the second to associative reproduction, and the third to a higher eduction-level called conceptualization (see p. 156). The third level suggests a high intelligence in which an organizing *x* is educed by which suitable solutions of problems are hit upon, or by which experience is generalized according to Judd. On that level *particularly* a freedom is enjoyed in inference eduction. If in the senior high school a pupil with a free field ahead and a stimulating challenge fails to emerge above the level of "empirical concretes," it is safe to advise him upon graduation (and some months prior thereto) that he will, in all probability, meet serious difficulties in college. Shall we say he should not go to college?

If school administrators answer that question in the affirmative, are they going to have the courage to say it firmly and impartially? The son or daughter of the prominent alumnus or the first citizen of the community must be shown no favors. A severe strain will be placed on the moral backbone of a timid administrative staff. Will it not be prudential to transmit the record of the aspiring graduate who has been energizing on the *C* level (the level of "empirical concretes" in which he consistently operated in the senior high school) and let the registrar and faculty of the college or university disturb themselves about the matter?

There is much more that ought to be said about people whose performances are pitched to the level of "empirical concretes." Tens of thousands of certified teachers accept the materials of instruction from the printed page on that level, and they are not disturbed about a procedure that does not rise above the daily regurgitation of lessons. Hundreds of professors, branded with their higher degrees, use their frayed and faded lecture notes which are nothing more or less than "empirical concretes." It happens whenever the professor resorts to the proverbial barrel as a source of supply, and it makes precious little difference whether he himself originated the notes on some previous occasion or copied them as a graduate (or undergraduate) student on the road to a degree that never was a teaching degree. Dealing with ready-made conclusions, or any form of a delivery of the finished product, is an unfailing symptom of a mind rising only to the level of "empirical concretes." It is the *A* professor or teacher who rises to the level of conceptualization and creates his ideas and technique as he works forward. Why not classify teachers and professors (the *finished product*) into *A* *B*, *C* "ability" groups, and let students know that they are not only electing courses, but also *A*, *B*, or *C* professors and teachers? It would work out with colorful efficiency. The students would point to this professor or that teacher, saying, "There goes a *C* professor or teacher." (And to complete the picture, administrators, supervisors and such might be classified and have appropriate labels by which they could be identified in conventions assembled as *A*, *B*, or *C* men.) To add spice to the experiment some *A* professors and teachers would be assigned to *C* sections, and, to make for reciprocity, some *C* professors and teachers would be allocated to *A* sections of students. To be sure, sensitiveness and status would have to be wiped out. Is it any more dangerous to brand professors and teachers with the pedagogical scarlet letter *C* than it is to do it to pupils?

The bottom man may enjoy a full realization of his limitations, but he prefers to treat it as a private matter. To believe people can be sectioned by ability and the facts kept a secret is naïve indeed. Why ask that it be done with pupils only? Some of these baffled fellows do find themselves afterwards. Some of them go on to college with minds made up to win, and they do win by audacity. Some of them win the prizes because of undaunted enthusiasm. It is no easy business to give respectable advice in such matters.

A searching question arises at the beginning of our general survey of such an integrated contract as we have presented. What are the criteria to be used in placing the items of the contract in the circles? Why are certain items included within the inner circle and others distributed in the outer areas? We shall present a little later three principles for guidance in the building of integrating contracts. They are only mentioned at this stage: (1) The principle of extension through the quantitative approach; (2) the extension of materials by means of a qualitative intention, increasing the difficulty of subject-matter and problems; (3) extension by enrichment.

In passing, we desire to reemphasize the value to be derived in the preparation of teachers in the direction of organizing units of work for teaching purposes. If the prospective teacher in his special field were presented with the problem of constructing such integrated units as the illustrations in this chapter suggest, we should find a way of securing an outlook upon the materials of instruction that would mean to the student in preparation a high type of review, and above all a method of approach both scientific and bristling with challenge. Let any prospective teacher preparing to teach arithmetic in the grades or geometry in the high school undertake the organization of an integrated contract on *factoring*, on *loci*, on any comprehensive and significant unit of learning, and our "review course" comes to life. Such is to become the basis of "content" courses in the professional preparation of teachers. This type of analysis extends with a high validity to the lower grades. What is suggested in mathematics applies with equal significance to all subjects of the curriculum.

We shall have much to say concerning the new attitude of both teacher and pupils as we turn to procedure values in this discussion. Just now a caution: We are going to avoid lock-step methods. As we study the finished contract let us not conclude that the "excellent" pupil will be required to cover the ground laid out in the *Fair* contract before moving out into the more difficult areas. No rule is adequate on this point. There are types of contracts in which the excellent pupil may move at once way out on the frontiers, for the reason that what he does in the outer circle includes and clarifies all that is comprised within the inner circles. In checking performance, it ought to be perfectly obvious that the pupil who sails out into the upper areas will not need to have his work meticulously scrutinized in the simple one-relation materials of the inner circle, if the simple elements are included in the higher extensions. Many of the elements in the inner circle are recombined in the more highly involved exercises and problems in the outer circle. Be it remembered that *performance is only a means by which the teacher is to form a judgment concerning a continuing mastery of central ideas.* This principle will assist the bewildered teacher who gets stranded in a morass of papers and note-books which are so generally approached as products to be criticised and examined.

These simple relations are mastered at sight by many alert pupils. Teachers waste precious time and energy "fussing" over the results of direct learning. *What a pupil does without effort in his contract is seldom worth checking by the teacher.* The habit of a quick survey of work easily done should be acquired. The teacher should create an "eye" for the central idea. The capacity to detect the direction of a pupil's thinking is vastly more important than to read, without a discriminating sense of values, pages of pupil performance. What a pupil does with his mind *in low* is worth checking only for purposes of finding some way of getting that pupil to turn on the power. Results obtained by wool-gathering minds, by diligent note-taking copyists, and by pupils tracing the drawings and reproducing ideas are hardly worth checking at all. The energy of teachers should not be wasted in the futilities of a mechanical pedagogy. Education arises at the point of crisis and is carried forward, not by communication of belief, but by pursuing wholeheartedly a problem in the light of the facts, guided by tentative principles or hypotheses, at least, against which and with which results are checked. To get into the very heart and center of those activities which are challenging the abundant life of students, and to guide and stimulate mental life in a vitalized intellectual adventure will become the thrilling task of the new teacher.

We shall not forget our guiding principles here. "Eduction of relations" will be discussed in Chapter III. The ability to educe the higher relations presupposes facility in dealing with the less-involved relations. Wherever it is possible to grip the simple elements in a higher movement, it ought to be done. Observance of this fundamental principle in the *Contract Plan* will meet a criticism which has been raised to the effect that needless busy work is introduced. All that can be avoided by common-sense methods. One of the finest points in the *Contract Plan* is the provision it offers by which every member of the group may work up to capacity in worthwhile challenges. No teacher is tempted to accept one-half what a pupil can do. No pupil is induced to believe he knows how to work when he has only turned on the switchboard a third of the way, when he might have turned on the full voltage of his power house in a joyous release of energy. Too many students never enjoy the thrills of a second "intellectual wind."

A disastrous thing is happening to the intellectual life in a general "let-down" through the operation of a negative principle involved in the drive for minimum essentials of content and those programs designed to adapt materials of instruction to unchallenged minds. The *Contract Plan* of integrating units of creative learning suggests a temptation in the opposite direction. A richly diversified curriculum content is projected. The capable student is challenged in a genuine situation. Any mixed class (and all classes are mixed classes) will provide the challenge under teaching and coaching of a high order. The *comprehending* guide lines will make possible a basis of participation. The pupil working way out on the wave length will bring his contribution into the center of the circle where it can be appreciated by every member of the group, for the reason that the parallelogram idea is the solvent in every composition of the unified contract. So it is with the relative-pronoun idea, the principle of capillary attraction, the electron-complex, or any one of a thousand comprehending principles placed at the center, becoming at once the pulsating core of the contract as a whole. We shall need to look with a searching eye for these emerging unities. It requires of teachers a new attitude toward subject-matter.

Many other observations will arise in the general survey of our finished contract presented in terms of integrating levels. We shall attempt to reflect upon numerous aspects of the problem in the "set-ups" which follow. The attitude of boys and girls will be studied as we proceed. We shall endeavor to present the *Contract Plan* in action. One of the first observations to be made is the disposition to inaugurate some educational "reform" by tacking new labels on old practices. It is to be expected that many "experiments" in the contract method will be made and pronounced failures. Such is the history in all experiments from Christianity to experimental Junior Colleges. It is so easy to be swindled by progress. Virtue inheres in any label as such, only in so far as new principles are derived, and practices harmonized therewith. We have no quarrel with the conservative who does not see fit to try a new challenge. What we desire to make perfectly clear is the fact that tacking a new label on old practices will in no sense invalidate the proposed experiment. If the old set of ideas and the old prejudices are merely rearranged, there is no reason to expect a positive result in the "reform." The disease, known as *labelitis*, is an insidious thing. Naming a new departure *it*, does not make it *it*. (Let the boys and girls in the senior high school diagram that sentence with its three *its*.) That is to say: Naming a procedure a contract method and superimposing on it the old formalisms of the recitation system will probably prove a disappointing episode. Any rearrangement of either our school-room furniture or our mental furniture will effect no fundamental reform. New ideas must be created to take the place of existing patterns when a vital change appears. Changes in industry make the point luminous.

What is the attitude of students toward their studies? The attitude of the student is not incomprehensible to a certain professor. He knows that many students attend college to get a bachelor's degree with the minimum amount of sleep, study, and classroom attendance, and the maximum amount of joy and popularity.

"Learning should make you want to study further. The curse of a university education is the fact that the instructor spends too much time trying to ascertain whether or not the student has done the work he is supposed to have done. This is a weighty problem, for there are more than '57 varieties' of students with which he must deal. Notes taken are not evidence of any assimilation of the material at hand, but merely evidence of having had the book open before you for a short while."

One might indulge in the common practice of framing indictments. On the whole, one might very properly maintain the proposition that our students come to us with far more idealism than we imagine. We might urge with fervor a change from the bombardment of routine to a finer and a truer education by participation. We are endeavoring to be very practical in this chapter. Is it not true that pupils are not being challenged in creative adventures? To what extent is the system at fault in producing all too many boys and girls with a mind-set such as Johnny displays?

"Johnny, how much is 2 × 3?" Johnny sat like a knot on a log with his *mind*-set. "But surely, Johnny, you know how much 2 × 3 is?" Answer: "*Sure I do, but you haven't developed me yet.*"

It is that kind of inhibition (protective coloration) which is produced by a system that promotes passivity. We are setting out the *Contract Plan* with a view to making provision for a vital challenge to every member of a working group. One of the important considerations in the plan is a direct and frank attack upon a prevailing methodology that is designed, as we see it, to produce a finished docility and a helpless dependence. The new school will be a different school from that attended by little Billy (six), who, when asked what he was doing in the great adventure of the intellectual life, replied, that he was just waitin' for the rest of them to catch up. The new school will be a different school from that one in which the new cadet came, asked a question without a strike, and then changed it this way and that, when finally a little fellow in the back row piped up, "We all know what you want, Miss, but you ain't asked the question yet that will fetch it." The new school will be different from those schools in which our Jimmies and Susannas are admonished to pay attention, thereby running the risk of ruining their minds. Paying attention in the schoolrooms of the land is for the most part an act of pedagogical courtesy. The new school will seek to make the class period a productive, thought-provoking hour for every member of the class, each energizing at his best. Each individual will be stimulated to find his stride within the circle described. No upper limit will be set for any pupil in the group. Neither will any pupil be isolated in a selfish individualism by which goals are worked up and checked off. These new words such as integrating, interrelating, comprehending, emerging unity, unifying, and the like will all come to have a new significance. Functional drill work will receive due emphasis. A mere automatic repetition of habit-fixing bonds will be discriminatingly handled. The spirit of the game, the contest, will not be deleted.

We are turning now to a descriptive account of processes by which integrating contracts are produced and negotiated. Emphasis has been repeatedly placed upon the central unifying principle, the guide lines, the working hypothesis. It has been indicated that some of the very finest types of creative education may be initiated by setting up data for the mind to work on and by which to come to self-discovery of the central idea, the organizing principle. In other words, we are anxious to avoid any inflexible practices that would result in superimposing a guide line or principle or any hypothesis as a form or a stereotype. The prevailing practice in foreign language may well be challenged. Excessive devotion to form, on the theory that declensions and conjugations and minimum vocabulary must be acquired before any serious reading of the language is begun, is not difficult to explain in the light of tradition. Another approach is possible. For several years the writer worked in a situation in which the first day of the beginner's exposure to Latin started with the first paragraph of Cæsar, "*Gallia est omnis divisa in partes tres.*" (All Gaul is divided into three parts.) And in the course of events when *Galliam* appeared, a change in form, the idea of case consciousness began to sprout. The procedure was one of *discovering* the changing forms of a highly inflected language. At the end of the year, class after class mastered not only the forms but read with more or less enjoyment a book or two of Cæsar as fundamental substance, if you please. We cite this illustration for the purpose of challenging an ancient custom, not for the purpose of being mischievous. There is an old feud over form and content.

The following illustration is self-explanatory. A seventh grade class in general science without previous preparation on the materials listed carried through the following experiment in a sixty-minute class period under the direction of Professor Ira C. Davis in the Wisconsin High School, University of Wisconsin. The directions were written on the blackboard. Pupils began at once. No one waited to be developed. The procedure illustrates a movement in productive introductory science.

THINGS TO DO AND THINGS TO LOOK FOR

A. Fill a bottle or tumbler nearly full of water. Cut strips of blotting paper, tablet paper, and paper towelling three or four inches in length. Hold each strip so the end just touches the surface of the water. What happens? In which strip do you see the greatest action? Examine each strip carefully. Do you notice any difference in structure?

B. Repeat part *A*, using strips of cotton, silk, wool, and linen. In which cloth do you see the greatest action? Which fibers appear to be the most closely woven?

C. Cohesion is the attraction of like particles for each other, as water for water. Adhesion is the attraction of unlike particles for each other, as glues for wood, or adhesive tape for skin.

Fill a pan nearly full of water. Place a clean, dry, glass plate flat on the surface of the water in the pan. Do not let the glass sink in the water. Pull the glass plate slowly from the surface of the water. Is the bottom of the glass dry? If not, what is on the plate? Was the glass plate pulled from the water or was water pulled from water? Is the force of adhesion or cohesion the greater? Give reasons for your statement.

D. There are some long, very narrow glass tubes in a beaker containing colored water. Are all of these tubes alike? If not, in what way do they differ? Has the colored water risen in the tubes? Has it risen the same height in all of the tubes? In which has it risen the most? In which has it risen the least? What determines the height to which the water rises in the tubes?

The problem now is to explain why the water rises in the tubes. What force always tends to pull things downwards? What force in the water tends to hold it down? What force between the glass and the water tends to pull it up? Which of these forces is the greater? Why doesn't the liquid continue to rise higher and higher?

E. Fill a glass tube, open at both ends, nearly full of dry soil. The soil may be held in the tube by tying a piece of cloth over one end. Place the covered end of the tube in a dish of water so that the lower end is just below the surface of the water. What happens? Why? In what kind of soil will water rise most? Why? If in doubt, try this experiment with different kinds of soil.

You have discovered that water rises in blotters, fibers, fine glass tubes, and soil. What shall this action be called? If you were to give a name for it, what would you call it? Find the meaning of the Latin word *capillaris.*

THINGS YOU SHOULD LEARN FROM THIS EXPERIMENT

The attraction of like particles for each other is called ....

The attraction of unlike particles for each other is called ....

The attraction of wood for glue is called ....

The attraction of mercury for mercury is called ....

The rising of liquids through fine tubes or porous material is called ....

Water rises the most in ...... soil.

(A functional use of "completion test" is illustrated in this *teaching* procedure designed to promote self-mastery of an organizing principle.)

QUESTIONS YOU SHOULD BE ABLE TO ANSWER

1. How does oil rise in a lampwick?
2. How does a towel dry your hands?
3. How does ink run out of a fountain pen? (This is capillarity upside down.)

4. What is the meaning of sub-irrigation? What conditions are necessary for sub-irrigation? (Consult book.)

5. Cohesion within mercury is greater than its adhesion for glass. Would you expect it to rise in fine glass tubes? Place these tubes in a jar of mercury. What happens? Why?

Here we have a capital illustration of one general approach. The opportunities for this "inductive" experimental "set-up" will increase and multiply wherever teachers begin to place the emphasis upon the processes of education instead of the organized products. To the doubting specialist who looks upon the junior high school as the home of general science and bad grammar this illuminating experiment might have been studied with profit and satisfaction. These seventh-grade youngsters performed the experiments and discovered the central idea. The principle of capillarity was for them no meaningless jargon learned in a "phrase factory." They gripped a continuing principle that stuck to their intellectual ribs, and they thought it time and again in life situations as they were reminded in new experiences of these experiments done with their own brain-guided hands. If there remains any surviving objector to general science, still thinking that the "edge will be taken off," it might be in order to suggest that the very opposite result may be expected when boys and girls are gripping a central idea and are being gripped by it. A superintendent recently raised an objection to the integrating contract, declaring that it was a hazardous procedure because, he alleged, there would be nothing left in the curriculum for pupils to do in the senior high school. It was suggested to this man that he might place at the center of the three concentric circles the emerging unity called by scientists the *electron-complex* and try, until he reached his three score and ten, to exhaust the possibilities of that guide line. An hypothesis may and does change. It is hardly a thing to be discarded, but rather a principle progressively caught up in some new *emerging unity*. While new knowledge is pouring into our life in bewildering fashion, there is also operating a synthesizing principle which leads to simplification through emerging unities, as Max Mason so ably explains the movement of scientific thought.

In the illustration just cited, a single purpose is conceived. We were interested in presenting one general type of approach in the "set-up" of the contract idea which starts with situations designed to assist the pupil in the discovery of some process or phenomenon that he might detect through experimentation. If that pupil becomes expectant of change by such procedure, if he begins to study a problem in the light of the facts, if he begins to record his observations in the things he is doing and seeing, if he is learning to check his words against some data he is handling, then it is clear that he is being introduced, at least, to the scientific method of making phenomena intelligible. This challenge is not presented in three levels, although the possibilities are clear in the "set-up."

The specialist higher up has expressed his apprehension concerning any thing "general" in the junior high school, whether general science, general language, general mathematics. He has been impatient with the movement because he requires a high degree of exhaustiveness in his own field. The clash has come for the reason that the exponent of the junior high school has stressed the need of general education. He has convinced himself that the great majority of junior high school children will never see a college or a university. Yet they are to participate in a civilization whose technique is science and mathematics. They are to become voting citizens and they are all already potential legislators and "statesmen." The objection is raised that general science and the other subjects labelled *general* are all superficial. Admitted. These junior high school children are nibbling at big ideas, but the process can also be a nibbling accuracy as far as it goes.

Here are two emerging purposes. One looks to exhaustive thoroughness. The other is concerned with a general introduction to a vast problem, a bowing acquaintance with a set of ideas and techniques with which everybody must deal in some fashion. The solution of the paradox does not lie in segregation. "Those who" are going in one direction, on to college, on to special schools in college, and "those who" are going soon into industry and out of school before finishing the senior high school—all that language is slippery. It presupposes a dualism and calls for an omniscience we do not possess. Moreover, industry is learning to furnish its own skills. It may not be the province of an engineering school in the university to turn out a telephone engineer or any other specialist brand of engineer. What the far-seeing organizer of business is saying now has to do with the fundamental substance of engineering education, and his injunctions read like those gems we have gathered about the old cultural education. It is interesting to hear the engineer and the manager of great business concerns quoting Matthew Arnold and Jacks and Dewey on the aims and purposes of education. It is becoming extremely doubtful whether the public should pay for the training of operatives in any business. Even stenography and typing will have to be defended on the basis of vital educational experience rather than a "vocational" basis. Journalism may not be a proper course in the high school, but newspaper writing might be a highly desirable and profitable method of vitalizing English composition. Industry is to train for its own skills. Even the college-trained engineer, it is claimed, must be de-educated before industry can use him.

These two paradoxes raise the issue which is moving into the center of the whole problem of public education and its relation to the specialist on the one hand and industry on the other. We have said in many places that every subject of the curriculum must be both vitally basal and vitally culminal for every pupil as long as he pursues the subject in question. In other words, the two aims, the demand of the specialist for exhaustiveness, and the demand of the administrator in public education for general education, must be caught up in an emerging unity and realized to some extent in every class-group beginning with the junior high school and running up through the senior high school, at least, with an increasing emphasis on both aims in the same class-group. The *Contract Plan* offers a practical solution of a very difficult problem. The daily lesson plan will not yield a possible solution.

Flexibility is a factor in the *Contract Plan*. The first general approach has been elucidated. It is not desirable or economical to try to discover the guide-line principles in all subjects or in any subject in all of its learning units. If the approach to subject-matter could be shifted from the delivery of the finished product to the creative processes in a procedure in which the research pattern operates, a new departure would at once be initiated. Any essential and abiding change must come by attacking the problem at the center of our concentric circles, and by locating there a pulsating core-idea that will become the tactical principle in the use of the materials of instruction directed to creative ends. Subjects differ in all sorts of respects as to details. In the general "set-up" there is a common idea expressed in various ways.

Let us take an illustration in one of the most difficult sectors, the social studies. Suppose a new challenge is started by placing at the center—the *moving wheel*. A problem-raising situation is designed. Questions about the *moving wheel* arise. Books and materials on social origins will intrigue interest.

How did primitive man break through the *mores* and institute a change? What phenomena suggested the idea of a moving wheel? A wealth of material will be arrayed as the shuttle is thrown back in man's development. Now we are suggesting that three concentric circles be drawn. If the class should work the contract up cooperatively, a large beaver board, 5′ × 5′, might be used. At the center appears the first day a guide line—the *moving wheel.* The problem-raising period of fifteen to twenty minutes is over. Some pupil may be ready before the hour is over to mention Westinghouse, and to place way out in the third level (the outer circle) the air brake. Why? The *control of the moving wheel* is one of our most serious social and economic problems. In fact, it is today an international problem of the first order. To be able to stop the wheel when and where it must be stopped is a measure of the progress of civilization. That item in the contract is written on the large chart. *The Real Business of Living* (Tufts), *Social Origins* (different authors), histories (a living text-book and others), descriptive readings of modern automotive industry and railroading and the like, all sorts of illustrative materials on *moving wheels*—these are hints merely of the ramifications of this contract. Materials are to be made available at the beginning of the contract. Gradually new phases of the challenge will appear on the big chart.

If the *moving wheel* is to be kept going for a period of two weeks, the various items of the integrating contract should begin to take rather definite shape about the fourth or fifth day out. The finished contract is not to be delivered to the class with instructions to make a choice of the level to be reached, followed by a set of motions not unlike those motions attaching to the lesson-hearing school. The contracts are cooperatively produced. Every pupil has a share in the enterprise. Every pupil is a partner in the making of the curriculum. In the *Fair* contract some optional material or problem should be provided. The practice of choosing and of taking responsibility for decisions made is an invaluable experience for every boy and girl. Out in the second level appears the problem: Study a modern Pullman car. Compute the work it does in twenty-four hours. How many men (laborers), working as they did on the pyramids, would be required to do the work of a Baldwin locomotive? Is it 30,000?

The *moving-wheel contract* may be done in the junior high school. The same *moving wheel* may be geared up to the senior high school level with a different array of materials and problems in the integrating levels. The *moving-wheel* idea, like some great hypothesis of the scientist, is inexhaustible. It goes on and it should be guided in its movement with intelligence. On the senior high level, a gallon of gasoline may be placed in the outer circle as a challenge to the emerging *E* pupil. (The procedure might produce a surprising number of *E* pupils.) That's the most challenging problem now facing the automobile engineer. How are we going to make a gallon of gasoline drive the moving wheel one hundred miles?

The potential is there. Other cognate problems will arise: Weight of car; reduction of the number of parts in the engine; a study of the development of cars from the first horseless carriage which had installed in it a whip socket up to the modern design; and then in imagination "see" what is coming. Another item may be a comparison of the managements of two of the great industrial concerns—Ford and General Motors. One is highly centralized; the other is highly decentralized but unified in a remarkably efficient way. What happens to imagination when it runs up against economic advantage? What we are trying to say is the obvious thing: Mastery of a vital principle is a relative matter. It is a continuing mastery. The principle to be observed in curriculum reorganization is the principle of integrating sequence. It is not a return to the old spiral method our fathers used. The common essential is a continuing principle. It is not a repetition or a review to have the *moving wheel* appear at the core of two contracts, one geared to the junior high school, the other to the senior high school level. The error is committed in supposing that some performance within a guide-line principle can be checked off as if it were the end of the principle involved. The only thing that is checked off and finished is a more or less valuable performance, as a rule. The student too often achieves a finished docility in a system of education that confuses performance and continuing mastery. The student, when asked what he got out of an alleged prerequisite course, replied that he got four credits. That answer might pass as a stale college joke if it did not reflect a serious situation, almost an impasse in a mechanically driven system of education, notably lacking the leaven of *comprehending*, unifying, and comprehensive principles.

It is not our purpose to go on multiplying and duplicating illustrations of the *Contract Plan*. The suggestive procedures are used to clarify, if possible, underlying principles and to stimulate imagination in developing procedure values. The *irregular-verb concept* furnishes a productive example for these types of analysis. Either concentric squares or circles may be drawn, and at the center the *idea of change* in the form of the verb is placed to express a sense of time. "Words have little habits of their own. Let's study them." Some intriguing way of starting the adventure into a poorly inflected language will be devised. The extension of this contract may be realized by employing mainly the quantitative principle. It will hardly be a mere quantitative extension, however. Seldom do we get just that. Each new verb added to the list has its own story to tell. Each one has its own fancy in changing its dress in this particular contract. For the lower grades, such a contract may be made a continuing one, and a little may be done with it from time to time.

As soon as it is deemed wise to give explicit attention to the irregular verb, a large board, such as the beaver board, may be set up in a conspicuous corner and verbs written thereon as they turn up either accidentally or by directing the search. A good plan is to have pupils in the intermediate and junior high grades make their own charts. The placing of these irregular verbs in the various levels may be a group problem or an individual challenge. In the latter case it is interesting to make comparisons from time to time. The second principle in building integrating contracts may be recognized. To illustrate: The verbs *lie* and *lay*, *sit* and *set*, may be placed in the third level in the eighth grade. The difficulty involved in their correct usage guides the pupil in placing them. In due time they may float toward the inner circle and become a part of the *Fair* contract. That may not happen until the twelfth grade is reached by some pupils. It is difficult to separate the three principles. They shade into each other. Enrichment is involved in all phases of an integrating contract. Enrichment does play a part in the survey of irregular verbs.

Somewhere about the tenth grade with these irregular-verb demons, *lie* and *lay*, *sit* and *set*, an item in the outer circle (*E* contract) might be a little imaginary story in which all possible forms of these two verbs in all modes and tenses appear. The thing could be conceived in terms of constructing a sort of dialogue in which each word becomes a character and seeks to express in fitting action or line the meaning caught up in every change. We are merely suggesting possibilities. It was done in a twelfth-grade class by the essay approach. A lad started it thus: "I sat at the table which my sister set. As I was sitting there, a fine dish was set before me," etc. He worked into his sketch with more or less nonsense every form of those two verbs including some of our idiomatic usages. *Do* and *see* and *go* will find a place in the second level early in the grades, and later they will move into the inner circle and will be expected to behave themselves in good form ever after. After the seventh grade? Would that they might!

Only a comment or two now. In a twelfth grade one day an associate asked the class what was up. A smiling boy responded: "Oh, it's *lie* and *lay*, and *sit* and *set*." "When were you first exposed, Franklin, to these words?" "I think we had them first in the fifth grade as a lesson." "Then what?" "Well, we had a lesson on them again in the sixth grade, again in the seventh." "Well! Why didn't you master them?" "You see, it was like this. After we got on to it, we concluded we were going to have them again the next year. So it has happened right along. I have a brother in the university. He said his professor of English gave the class an assignment on *lie* and *lay*, *sit* and *set*." At that, the associate member of the staff remarked, "Well, Franklin! Why don't you master them?" His reply was refreshing. It was: "*Why? What's the hurry? I'll have them again next year*." That delicious answer opens up a new problem and perhaps reveals an attitude.

In terms of mastery, when should we expect correct and undeviating usage of such words? At what point in the grades or years of the school should it be set as a final hurdle? The answer may be, at no point at all. Are there involuted and highly complicated, tangled and snarled problems of that sort which can not be set down as finalities? Teachers often get emphatic, if not vehement, about it. Can such matters be reduced to class standards and goals? Our suggestion may not be impressive or fruitful. It seems clear that some matters are too personal and intimate to lend themselves to rigid formulation. And yet, we do not accept less than the best from each individual. Is it not a feasible plan to get at the *common essential* running through this type of contract, and stress a growing sense of continuing mastery in an integrating sequence, leaving some things to time and further striving? The irregular-verb idea (time consciousness expressed in the changing form of the verb) is a growing concept. The concept is not mastered by the clock with a finished and approved cultural usage by all alike. The integrating levels of learning provide ways of escape (honest ways, too). About the seventh grade perhaps some pupils will reach out and incorporate the full significance of these difficult verbs; others in the same class may not overtake them until late in the senior high school. Yet the pupil overtaking them early and the pupil chasing them but not capturing them so readily—both are mastering the central idea of inflection to some extent, one going a little farther out on the wave length this year than the other. There are three observations at this juncture. (1) The poorer pupil will profit by hearing the correct usage of words in the third level, and a residuum of learning may be counted on for him when he meets in a subsequent year the *irregular-verb contract* thrown in a higher gear for him. (2) The pupil at any stage mastering the entire challenge in three levels will not be held back on account of a slower-moving classmate. What he does on any level is expressed in the common guide-line essential, and no pupil at any time should be required to "just set" and listen to a delineation of the obvious. He will have a realizable chance in every integrating challenge to move on to new frontiers. That is the essence of the *Contract Plan.* (3) Some light is shed on the organization of curriculum materials in this contract. It is possible to set forth clear-cut challenges in such a manner that pupils may know when they have come to a conscious mastery of certain central ideas. The problem of choosing courses in the six major fields is tied up in this procedure (p. 211). Practically, this suggestion means that a pupil may, if he wills and has it in him, master the things we expect of him in matters of English composition as early as the tenth grade.

Returning to the technique employed in the *irregular-verb contract*, any pupil who can find life more abundantly out on the third level will not be compelled to run a sort of three-legged race by being tied with bottom and medium boys. To indicate ways of securing full release of powers and also of sharing results, all members of the class go to the board with the challenge that each one may write the principal parts of as many irregular verbs as possible. They are off. In ten minutes Mary has written fifty verbs (150 words), John forty-eight, and Henry ten, and perhaps an unchallenged "Mike" makes a dash at two and misses both of them. The "median," if that helps at all, may run as high as thirty-three. The pupils move one place to the right and study their neighbors' contributions. "Mike" stands surprised in front of Mary's array, actually *seeing* now more irregular verbs than were dreamed of in his philosophy. Susie has checked "Mike's" *mistakes* and is asked to hear "Mike" pronounce all of the fifty at which he is star-gazing. In all, some one hundred different verbs are written on the board in this exercise. This is only a hint on procedure. The differential idea may be employed in many productive ways. The boy with only a dozen may have one verb nobody else has found. That boy's barometer of self-esteem may rise on that account. We are escaping an enormous wastage involved in the didactic methods of collective teaching. Scope for initiative is provided. An unflagging enthusiasm is cultivated in many a pupil who would otherwise remain unchallenged. Opportunities for self-correction and self-criticism are constantly at hand.

Some principles of the *Contract Plan* were employed by a university professor in preparing candidates for higher degrees in the foreign language requirement. French was the language. The professor established at the center of the concentric circles the French verb. He warned his students that he proposed to do nothing at all with nouns and the like. These students were specialists in various fields. The man in electrical engineering was expected to find his own nouns in his special field. His reading was done in the field of electrical engineering. The professor declared that he, himself, could not be expected to appreciate the use of nouns in such a highly specialized literature. "Oh," he remarked: "I can *pronounce* them correctly in French. But that is a very superficial part of the language for your purposes. You will be able, yourself, to incorporate those chameleon-hued colorings which your words take on in the shifting currents of your own special field. All I can do is to keep my hand on the wheel at the center and guide you in your movement out in your highly attenuated zones."

In other words, the verb is the center of action. It is the guide line. Control the verb, and all sorts of "hook-ups" are possible. The man in industrial chemistry had a vocabulary quite exclusive. That man could reach out into the literature of his special field and make his nouns and ideas a living reality. That group of students in the French class represented some half-dozen specializations. The French verb was the unifying principle. It was the active leavening principle in the whole lump. The provision for individual differences was admirably exemplified. The organizing concept of extension through enrichment and special contribution was in full operation. Each student found in the central principle (the French verb) a pulsating core. Each special pursuit gained its full significance in terms of the central unifying principle. Not less than four or five of the fundamental concepts of the *Contract Plan* were illustrated in this experiment. The results were notable in that it appeared that the candidates did unusually well in their examinations.

Some objections have been raised against the *Contract Plan.* Many claims have been made for the plan. Perhaps the reader would like to have a definition of it. We are not particularly interested in formulating a specific definition. Any definition would exclude more than it could possibly include. Much depends upon what we, by chance, read into any such experiment. If we like the departure, there is a disposition to overstate its advantages. If we are inclined to be rather conservative, it is easy to find objections all the way from the naming of the plan to imaginary errors that might arise in the event somebody tried to make use of a ready-made illustration. There is no particular virtue in the name of the plan. If we find a way of improving teaching and study, it matters little what definitions we make, or what label we use, or what advantages and disadvantages are fabricated. Suffice it to say, that the *Contract Plan* will become precisely what we make it. It may be highly stereotyped and be used to produce mechanical results just as objectionable as the results so obviously produced by the lesson-hearing school. The plan may be interpreted as a means of releasing potentiality in wholesome ways for every boy and girl. We have sought to emphasize possible phases of a better and a truer education in describing illustrative procedures. Each example carries some dominant emphasis.

The apprehension that school marks will take on a commercial taint seems gratuitous. The thing to be aware of is the way the conventional system is operating. It is perfectly easy to superimpose both the philosophy and the practices of the old school on the *Contract Plan*. If the *Contract Plan* provided nothing more than a suitable situation for each pupil to work up to his best capacity, it would be ample warrant for a tentative approval. Common sense is not to be retired in the adoption of any program. Enthusiasm for any good plan will usually yield results of a high character. Two or three aspects of the problem are still to be emphasized.

There is a story alleged to have been told about Hawthorne. When he was a young man, under thirty, he was invited to Emerson's home with a number of guests. It appeared that Hawthorne found it difficult to enter into conversation. A guest tried to interest him. The guest complained to Emerson, saying, in effect, that he could not get Hawthorne to say anything. Emerson's reply was that Hawthorne could not carry on a conversation because he didn't know anything. It seems that Hawthorne had been a most diligent student in that he had devoted years to gathering facts about all manner of things in the New England hills. He had stacks of notebooks in which he had recorded with great minuteness descriptions of turtles and boulders, trees and streams and winding roads and all such things. He had thousands of facts. Yet Emerson said he couldn't talk because he didn't know anything. It was about two years after this evening party at

Emerson's home that Hawthorne began to write. In the meantime, he was gripped by a passion to explain Puritanism. His imagination was kindled and fired. Puritanism became a philosophy for him. He soon wrote the *House of Seven Gables*, *Twice Told Tales*, *Mosses from an Old Manse*, etc. Facts alone are barren. A quantitative-production basis of information will be futile. It is at best a half truth to assert that one must gather facts before one can think. Nothing is gained by seeking a tandem arrangement of such things as information, philosophy, creative productivity. Mathematics, physics, chemistry, and engineering degrees do not make the engineer. If imagination is lacking, it's all a sorry mess.

The writer indulges in frequent questioning of college students on what their "courses" have meant to them. "What does Ivanhoe mean to you?" Answer: "Oh, yes. I remember I had that as an assignment six or seven years ago." "Is that all?" Answer: "Yes, that's all I can think of just now." Ask hundreds of students what they got out of history or Latin (almost any course) and a typical answer is, "Three credits." After four years of French with an actual conversational practice amounting to something like twenty hours, how many students could ask for a piece of apple pie in correct French? After two years of French, fewer than half the pupils can tell the meaning of *J'ai dû partir sans vous attendre.* After four years of Latin, plenty of students could be found who could not give an intelligent reaction to the title, *Quo Vadis*. They have studied Latin, they have gone through the motions, and when they get done with it they are done with it. Are we developing a Nation of lovers of good music? Do our people care enough about the franchise to exercise it? Neither a sense of responsibility for voting nor a keen historic sense is emerging out of our conventional methods of teaching. How many high school graduates (and college graduates) can react intelligently to the Battle of Marathon or the Monroe Doctrine? Do our college instructors rejoice over the preparation of entering freshmen? Are the results of the testing program reassuring? Not one in fifty who have studied geometry could demonstrate, ten years afterwards, that the sum of the three angles of a triangle equals a straight angle. Examinations held by the College Entrance Board are illuminating. Everybody knows the type of students taking these examinations and the nature of the drill and coaching in addition to regular teaching employed in getting the candidates ready for the ordeal. A picked lot of students are crammed, reviewed, and coached and recoached. Out of this picked lot in one year 75% failed to make a mark of 60 in Cicero; 69% did not rise above a mark of 60 in algebra; 42% failed to make a mark of 60 in geometry. No data are at hand to indicate what the marks would have been for the tens of thousands who pursued these and other courses with no hope of overtaking them.

These results have not been obtained under the

Contract Plan. They must be checked up to the lesson-hearing school. In point of fact, both recitation and lecture systems have reached an impasse. Both have carried the emphasis on the delivery of the product to the receptive mind of the learner. A lifeless reproduction of facts, information, opinions, laws, and even hypotheses characterizes the procedure under both systems. One prevailing explanation of the results just cited is the *alibi*—low mentality of the "masses" attempting to enter higher institutions of learning. Too many morons are trying to study Latin, mathematics, science, and all the rest of the "aristocrats" in the curriculum! That is the easiest explanation of a bad situation. It requires no responsibility really to do anything about it. Another explanation has been projected as a realization in these pages. It is a definite program in which the courageous and intelligent man, fired by the possibilities of a new scientific humanism, sees in these baffled children and youth unawakened minds, unchallenged intelligence, and a high potentiality.

One of the most difficult problems of the teacher is to help people to understand that their present civilization, their achievement of the day or century, does not mean perfection. We need a little of the imagination of the men who see things in industry. A gallon of gasoline has the potential to drive a car 100 miles. That is the challenge to engineers in automotive industry. In a decade or two the finest automobile designs of today will be gathered into the museum and looked upon as a heap of junk. Too much weight for what they carry! Too many parts in the engine! Yet the uninitiated are hypnotized by the civilization that is. A forward-looking vision is no denial of the retrospective vision of accomplished fact. The point is, the present attainment is not the final goal.

The writer is not defending the *Contract Plan*. Refusing to try the *Contract Plan* or some other experiment is clearly not working satisfactorily. A bitter partisan who vigorously opposed the League of Nations finally decided that we ought to join the League for the reason that staying out of it was not working. No attempt is being made to answer objections raised against it by critics standing apart, trying to tell us why it won't work. Anybody who wishes to defend the conventional system is entirely within his rights. Anybody who desires to patch it up has a perfect right to do so. Any defender of the old methods who contends that cultural values are to be preserved has a free field in which to operate. It is highly probable, however, that culture in the old sense will never again be attained except as a by-product. The critic who looks at a finished, integrated contract and finds certain disadvantages should be warned that he is looking at the wrong end of it all. It is easy to work up pedagogical nightmares over the *Contract Plan.* But what of the results of our conventional practices? Is there any joy in defending the *status quo?* We have been primarily concerned in setting forth a preliminary definition of the situation. It is our hope that the movement for

CHART B

E

Prescribed Temptations:
(2) *Stories of King Arthur and His Knights.*
(2) *Men of Iron.*

(2) An essay or sketch in writing, illustrated perhaps, dealing with some phases or scenes in *Ivanhoe*.

G

(1) Biography of Scott.
(1) Life of King Richard.
(1) Selections from *Gawain and Green Knight.*

(1) Chivalry (knights, squires, pages, combat, etc.).
(1) Sketches of characters (Rebecca, Gurth, etc.). (Make them real by tying in with people we know.)

F

(*a*) Reading of *Ivanhoe* (not every page of it by every pupil).
(*b*) Mastery of leading events in *Ivanhoe.*
(*c*) Identify disguised characters.

A JOURNEY INTO THE PLANTAGENET WORLD.
KNIGHTHOOD IN FLOWER, etc.

(*d*) Pointing out climaxes.
(*e*) Optional work.
(*Fair contract.*)

(1) Map of Ivanhoe-land.
(1) Drawing armored knight or dressing a doll in armor describing parts.
(1) Feudalism (a sketch).

(1) Robin Hood Ballads.
(1) Drawings of castle, moat, turret, drawbridge. (Geometrical and physical principles of drawbridge illustrated by pupil.)

Dramatization. (Points to be evaluated if desired.) Wamba and Gurth. Gurth and the Outlaws. Rebecca caring for Ivanhoe. Black Knight at the Hermitage, etc.

(2) Brief account of making of English language.
(1) Original drawing in colors of some characters in *Ivanhoe*.
(2) Original imaginative work in continuing parts of the story by stopping the reading at certain points.

(Caution! Charts *A* (p. 52), *B*, and *C* (p. 110) are presented as the finished log-books, as it were, of the prospectings carried out by teachers and pupils under certain conditions. They are intended to stimulate interest in a new general method. At best, they are illustrative of fundathe *Contract Plan* will not be formalized. That is not the way of experimentation. If we can find by the *Contract Plan* a way of realizing creative and enquiring types of education, it will prove an alluring adventure. As an adventure it can not be defined any more than a journey can be defined and appreciated before it is taken.

Let us catch up the thread of the argument in one or two closing illustrations. At the center of three concentric squares appears a gripping, challenging statement. (*A journey into the Plantagenet world, one of the few great pictures you will all want to enjoy. Chivalry. Knighthood was in flower. A mighty struggle between the Normans and Saxons.*) *Ivanhoe* will give us a glimpse into that world. In a few minutes the *Problem-raising movement* is over (p. 32).

Suggestions on such an integrating unit as this *Plantagenet Picture.*

1. Find some intriguing guide line and place it at the center. That central unifying principle will give a touch of color and a sense of realness to the adventure; it sometimes provides a goal.

2. A finished contract is not set out as a formal assignment to be gazed at. What comes at the end

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mental principles to be observed in the production of a great variety of results which may be more or less similar, yet richly diversified to express a living reality under all sorts of conditions. We are suggesting that a start be made by drawing concentric circles or squares and after finding a guiding principle at the center to build the contract cooperatively. The notes on charts *B* and *C* are included for the purpose of assisting the reader in envisaging the movement of a principle in action. Only suggestions are made. In fact, the only way to appreciate the significance of the movement is to become a participant. We are spending no time trying to convince the observer of the merits of this adventure.)

of the journey should be evaluated at the *end* of the journey in the light of the facts and experiences gained by a genuine prospecting.

3. The first day out in the Plantagenet world through *Ivanhoe* may produce in the picture (in the concentric squares) the organizing guide-line statement caught up in a short *problem*-raising movement, and the placement of item (*a*)—*The Reading of Ivanhoe*, carrying the explanation that it may not be expected that every pupil will read every page.

4. If it is discovered the first day that any pupil has read *Ivanhoe*, a *prescribed temptation* may appear on the *E* level. *Stories of King Arthur* and *Men of Iron* are suggested. That pupil moves on out and gets a glimpse of his *Plantagenet world* through another approach. He is not compelled to "set" and "cover the ground" again.

5. New items will appear the second day, and the third day, and the fourth day. If the unit of work is to extend over a period of two weeks, the projected form and shape of the completed contract might appear the fifth or sixth day.

6. The contract is cooperatively constructed. No two classes, no two schools should be expected to produce identical patterns.

7. We desire to make very emphatic the optional item in the *Fair* challenge. No pupil is to be denied a realizable opportunity to participate in any part of the contract. There is to be a chance to venture far up some alluring canyon. In this contract, it means very definitely that a pupil not likely to

emerge above the *Fair* level may go out and indulge himself in a bit of dramatization, and thereby satisfy the requirements for his contract. (That point of satisfying a requirement is the least significant thing about it, although it may be made the means of securing something worth mentioning.) Another pupil may move out for his option in some other direction.

8. It's no idle matter to have a boy entering upon his Romeo*ing*-Juliet*ing* experience bring in a poster of his Rebecca done in color and modern coiffure, standardized mongolianized eyebrows (perhaps), and an artistically designed dress that an exacting mathematician might, ethically speaking, regard an improper fraction. The poster is set on the ledge in the classroom. There is *his* Madonna. And it is well to place our fingers on our lips and indulge in no injudicious praise. Some of our most vital experiences are in the non-metrical.

9. If it is deemed desirable to reduce items to some point system and to set forth a scale on the basis of which something suggesting an objective standard may be used, the numbers in parentheses may be so used. Some alleged values may be attached to each item in the inner square.

10. Flexibility is punctuated. A slow reader with a reading rate of less than three words a second may not be expected to read the entire story of *Ivanhoe.* Certain parts may be explained and bridges may be built here and there. Some pupils may find a real challenge in original imaginative work by reading up to some climaxing point, and, laying the book aside,

create what might happen. The episodes may be selected by the pupils as well as the scenes for dramatization.

11. Some youngster will explain the drawbridge by means of a diagram and illuminate the story with some geometrical and scientific principles quite beyond the teacher's understanding. To insist, as a purist might, that such things do not belong in a class in English is really absurd if not pathetic. In years to come, just such incidents in the life of a youngster may be the means of making the fundamental substance real.

12. The materials in the third level are notably more difficult in many respects than any items on the way out. The principle of extension by increasing the difficulty is recognized, although the main contention in this sort of subject is that enrichment should be the major principle.

13. In the "set-up" of individual prospectings up this canyon, sign-posted *The Plantagenet World*, the teacher will have a word with the pupils early in the morning, or at some time about the campfire discussion, in the second movement (*Directing-Study*), and will suggest some intriguing journeys for these young discoverers. All the old pessimisms about what boys and girls won't do will have to be cleared out. They come to us with vastly more idealism than any loyal defender of the bombardment of routine will admit. Little hints: "Try a sketch in writing, John and Margaret." "Suppose you work up the making of the English Language, Junior." "You might try

dramatizing *Rebecca caring for Ivanhoe*, Tom and Eleanor. Get your cast." In brief, guidance is possible just for the reason that a practicing ground for the exercise of initiative is provided.

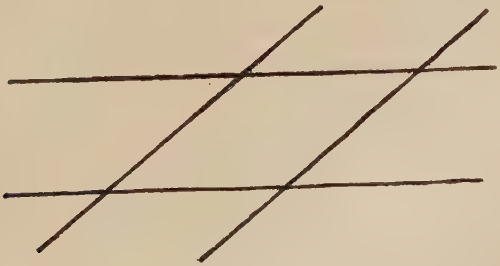
14. The three-movement procedure projected in Chapter I will be applicable here. Comparisons in procedure values will prove stimulating. Preparation of teachers for the *Contract Plan* will include the building of integrating units of creative learning. Just to get into the habit of seeing subject-matter in these academically constructed patterns on three levels will call for a high type of mental energizing. Teachers of "lessons" will no longer be fabricated. A mastery of the subject will be expected in the *Contract Plan.*

"Fourteen points" ought to be enough to make for any new departure. The central fact to be emphasized is to make it perfectly clear that charts of all kinds are made *as we go* by using the compasses available. Procedure calls for an intelligent application of fundamental principles. The practice of superimposing ready-made charts upon teachers and pupils misses the vital point in an adventure. Any analysis of printed contracts, integrated on three levels, will be valuable only in so far as procedure values are included. It can not be made too emphatic that the *Contract Plan* calls for a progressive, self-originating, cooperative development of working units of creative learning in a process in which a diversity of patterns will appear on the same general theme. By way of parenthesis, it seems pertinent to suggest the possibility of a new type of cooperation between major departments through the *Contract Plan*. Suppose, for example, the teacher of English and the teacher of history move into the *Plantagenet world* simultaneously, perhaps, with the same class group—one approaching the Plantagenet picture as indicated above, the other the same picture by an arrangement of materials relating to the historical movement. These departments have many times sought to talk themselves into harmonious relations. No productive basis of cooperation has been evolved. On the contrary, it too often happens that in one department the pupil learns that our English and American heritage has common roots, that the tradition of Hampden and Pym is carried forward by Jefferson and Lincoln, and then the same pupil goes over into the other department and is not made aware that the Declaration of Independence was made possible by the Magna Charta.

General observations should grow out of the delineation of specific illustrations. The picture of the Plantagenet world, conceived as one of a half-dozen great pictures which everybody might like to know and live by, perhaps, has been presented in the light of three principles thought to be useful in the *Contract Plan*. On the face of it, one might suppose that quantity production is the goal. Not so at all. There is no purpose in requiring a pupil to read four books breathlessly when he might better spend his time reading intelligently one book. The quantitative principle of extension is important. It should not, however, operate in the direction of imposing extra reading or work merely for the sake of reading more pages. That would be thoroughly puritanic, and would reflect the practice of allowing extra credits for additional chores. That practice is quite common in the lock-step systems. Capable pupils may be persuaded to do more than the minimum essentials. It is a sort of bargain-counter pedagogy. The principle we are urging definitely avoids all cheap forms of busy work. If a pupil can, by *getting his mind in high*, solve twenty problems, translate twenty sentences, diagram twenty sentences, read twenty pages *in the same time* that he would do half that number with his *mind in low*, then our contention is that that pupil is infinitely better off, intellectually and morally speaking, if he turns on the power, *while he is at it*, and does the twenty instead of the ten. It is not a question of devoting long hours to a contract on the *E* level in order to secure a high mark: it is definitely a question of working up to capacity *while working. A dawdling performance is the curse of our educational practice both in school and college.* The quantitative principle of extension is introduced in order to extend the minds of students in all those wholesome ways so highly prized in the companionship of the intellectual life.

The corollary is just as important. With a mere quantitative outlook, practice will degenerate into impossible assignments. Conscientious pupils will spend too much time trying to cover the ground. The central idea of the contract will be smothered in the dust of detail. Caution! Let us keep the central idea in clear perspective. Let us work for a mastery of central ideas and not lose ourselves in the mire of performance. It is gratifying to find a student challenged to the very marrow of his being with a difficult exercise (original problem) in mathematics, and going into it with all his might, spending not clock hours but his full energy on it during his lucid intervals and at odd moments, hanging to it with a *dogged-that-does* attitude until the solution comes—better that kind of energizing than pages and notebooks covered and fabricated by hours of routine. In the *Contract Plan*, the urge is always there (if the teacher has the vision) to go way out on the frontiers and discover some gripping problem and master it. It is not a matter of driving any pupil: it belongs to the fine art of teaching, and teaching so as to educate. While working on the relative-pronoun idea, one lad climbed up to the peaks and found such challenges as, "Than whom Beelzebub none higher sat," and the like, and he mastered these more difficult "hook-ups" of his relative-pronoun idea. It is perfectly obvious to an intelligent teacher that covering the ground for that boy in the simpler relations is a self-defeating program. The *Contract Plan* provides for individual differences. *Every pupil is expected to work in the integrating contract at those points where energizing is most productively exemplified.* In every illustrative procedure we have caught glimpses of the principle of qualitative extension. It should never be lost sight of.

The contract on the *Plantagenet Picture* suggests enormous possibilities of enrichment. A "shared life" may actually be realized in every classroom. Enrichment does not depend entirely upon the number of books and the extent of materials. A single great book, with Shakespeare not far removed, and a living philosophy will provide a vital basis for a genuine enrichment. Enrichment is quite as much the interaction of mind with mind as it is a provision of adequate materials. The sharing of experiences and the fruitful application of principles furnish a true basis of enrichment. The contributions of each member of a working group will be appreciated by a process of linking together the productions created within the *comprehension* of the common guide lines. Looking again at figure *A* (p. 52) one may see in the central figure a set of lines sweeping out in one direction and another set of lines in the same plane sweeping out in another direction. Something is going to happen when they meet. An idea is created (a parallelogram-idea here).



The idea grows. It is enriched and it enriches life. When two streaming tendencies meet something is going to happen. When two traditions meet, a new culture is in the making. When differences meet, a new creation is produced. When two racial strains meet, different things are going to happen. When two great principles or philosophies meet, something is sure to happen. So in the new procedure. New ideas are being produced out of the clash of authorities. New creative significance comes to light in the process of relating our several contributions. The possibility of enrichment lies in the integrating activities, arising out of a differentiated unit of learning.

A set of sweeping lines in one direction, and a set of sweeping lines in another direction, may be made the core idea or principle of a history contract. Elaborate the concept, and we have the *motif* for developing an organizing synthesis in the study of social forces. Streaming tendencies meet and clash. New ideas are created out of crises. Customs and conventions are smashed in the conflict. Some such guide lines should be thrown out as an organizing core and projected into a world of changes. Any study of history that does not create a mind expectant of change is barren. The shifting current of forces is not to be learned as if it were some static thing, some phenomenon dated in the past. The central idea, the idea of forces meeting, is a dynamic principle. Two powerful economic organizations, giants in the industrial world, meet. There is an example of that process familiar to all thinking people. A thrilling drama is being enacted before our very eyes. Something is bound to happen. What direction will these resultant forces take? With the guide lines projected, a new attitude may be realized in the study of history and science in particular.

The building of a mind expectant of change and forward-looking may well be conceived to be a working definition of education in one large circle of curricular interests. A sensing of the fact that new forces are converging and an awareness that something is going to happen, may be the means of organizing intelligence so as to enable man to cope with a changing order by creative planning. The World War was caused by a clash of economic and social forces which men trained to think in terms of the principle set forth in this argument should have been able to foresee in all of its potential horrors. Two systems of life came smashing together. The cause was not the murder of an archduke in Serajevo. That was only one of the informal murders of a war that was begun long before August 1, 1914, when the formal legalized murder of the millions of the finest and best of our young manhood began. History should reveal to the student the fact that going to war and making a disastrous peace will settle nothing. History should tell us a deeper truth. It is an indubitable fact that the meeting of two streaming lines of economic and social forces in a changing world can never be resolved by employing old patterns. The very conditions of any new situation cry aloud for the creation of new ideas and new technique.

Information alone will avail little. The answer to what is going to happen is not found in the book. It will be the minds that see and appreciate and comprehend the operation of continuing principles that may be able to escape catastrophe by studying new problems in the light of the facts. The simplest story and the most gripping episode of history may be approached and developed creatively. "These are the forces, the currents, the lines that are converging, boys and girls." "Something is going to happen." "Examine the data. What will happen?" "What is the significance of this set of lines (traditions, cultures, economic forces) sweeping out in this direction and meeting or about to meet this other set of lines?" "Something never dreamed of on land or sea will happen for you." Some such issues are streaming through the central principles. By gripping them and working forward into new situations, a new attitude of mind may be created. It may be the tactical principle to be employed in developing a critical faculty. At all events, the movement would stand in sharp antithesis to the traditional practices which are concerned with communication of belief and the acquisition of information as such. Methods of uniformity and indoctrination are inimical to the development of the critical faculty. It may be that the mania for standardized results is the blight which is destroying this capacity. Without it, "lessons" on citizenship are a mockery in a democracy.

One further illustration is included for the purpose of synthesizing many of the principles of the *Contract Plan* already developed in our discussion. Figure *C* presents a challenge in science. Ninth and tenth grade pupils produced the picture in a class in Biology conducted by Miss Lynda Weber, Wisconsin High School, University of Wisconsin. The procedure is typical of a year's work in Biology in the school, in which college seniors participate in preparation for teaching.

Suggestions on the development of the contract illustrated above:

(*a*) *Plants Need Water*, is both the challenge and a guide line. (The verb *need* is compelling.)

(*b*) Three moving ideas are projected the first day and they are caught up in a significant picture. (1) *How much;* (2) *For what purposes;* (3) *How obtained.* These are the ways, boys and girls, *Plants* are going to talk to you. Trees and plants have tongues now, and they have a wonderful story to tell you. Are you poets enough to see their arms (their wide-spreading branches) extended, inviting you to listen? You know scientists do not object to such lines as "Sermons in stones, and good in everything." "There's music in the air." (And then radio.) "But who can paint like nature?" (Camera.) "Eyes are as bold as lions, roving, running, leaping, here and there, far and near." (Microscope and telescope.) "Give me a fulcrum on which to rest and I will move the earth." "Why does not some one teach me the constellations and make me at home in the starry heavens, which are always overhead and which I don't half know to-day?" You can never become a great scientist without imagination. Just facts never produced a true scientist.

(*c*) The three large concentric circles are divided into three sectors. Let us think of the background of the picture as a color scheme in which each of the three guide-line ideas in (*b*) is expressed. Really, each sector is a part of a complete circle in itself. All three work together in nature. We set them in contrast for purposes of analysis. These three concepts, playing hide-and-seek in the background, are organizing and integrating principles.

(*d*) All these small circles, dancing about the central figure (suggesting the mad dance of electrons) represent phases of the general problem. Each one is either a principle getting itself clarified by some specific manifestation in objective terms, or a definite application of a principle growing out of the fundamental substance of the challenge. Two movements are thus integrated in the small circles.

(*e*) Each small circle must learn to behave itself properly. Each one is expected to look penetratingly for its place-card after a little preliminary and informal meeting in the big arena. Each small circle has a unique story to tell. Each one draws its sustenance mainly from one of the three pulsating cores. That is the reason why there is a best place for each figure in the picture.

(*f*) The area within the first large circle includes those items which are deemed very important in gaining basic understanding of some of the common processes by which plants manage to get on in the world. The *Fair* level begins to appear in this intention.

(*g*) Additional principles and enriching supplementary phases of the challenge are included in the second level, out to the *G* circle. The third level, out to the *E* circle, includes mainly enrichment materials rather highly attuned to the central theme.

(*h*) The pupil who may not be rising above the *Fair* level is expected to elect at least one clarifying example in each of the three sectors out beyond the *F* circle in either the *G* or the *E* area of the sector. That is to say, the pupil in the *Fair* contract moves out in a free field ahead and loops up three of the small circles and integrates them into his own creative synthesis. One purpose in making definite provision for this movement is to make sure that every pupil is actually making application of fundamental principles. If the word, application, revives pedagogical memories of Herbart, it is pertinent to remark that under formal methods in the old school, both teachers and pupils were thoroughly exhausted and out of breath before they reached the fifth step, application, in the last lap of the relay of the five formal steps. Another reason for the emphasis upon this phase of the *Contract Plan* is to provide a practicing ground for the exercise of initiative and a true socialization. No pupil is counted out in the adventure. The suggestion ties up with the discussion on the optional factor in the *Fair* contract in the illustration on the *Plantagenet World*.

(*i*) The contract on *Plants Need Water* was developed cooperatively. What appears in the picture *came to be* at the end of three weeks. Through the refinement of self-criticism and group and class discussion the best of duplicating productions was selected, and any shoddy or irrelevant contributions were rejected *by the pupils* (not always with a neat regard for diplomacy). Anything spurious was quickly detected by the pupils and unceremoniously rejected. The teacher does not need to disturb his pedagogical soul over the petty immoralities of discipline in such an enterprise. The contract became the challenge for the pupils. It was their project, and they found a way of doing it handsomely. It is one way of developing a fine sense of responsibility.

This project became for these pupils a thing as gripping as athletics. They did not have to be told to pore over their "lessons" so many clock hours. They did not have to be invited to come for a conference after school. The janitors, faithful guardians of our halls of learning, registered a complaint that these boys and girls were violating the sacred rules of some self-appointed, self-constituted authority in that they were found in the biology laboratory after five o'clock. They were there working up their individual circles; or they were there in little cooperating groups, discussing some common phases which were looped up into an emerging unity within the large unit, such as *transpiration* or *cultivation of soils;* or they were there after hours (delegated perhaps by class action) to go over the materials contributed by the members of the class and to arrange the selected items in the large picture, preparatory to a cooperative discussion the following day on the last emerging unity in the adventure. The claims of any pupil whose production was not included in the final picture were adjudicated in this potential world court as the procedure developed into the third movement —the unifying, organizing, socializing movement— which comprised about three days of the time devoted to this picture.

(*j*) In passing, a fairly obvious remark is in order. The *Directing-Study movement* (p. 37) was brilliantly negotiated in this challenge. Charts, pictures, cuts, drawings of great variety, color and detail were utilized in the small circles, thereby giving to the movement a basis of *creative objectivity*. It will be remembered that only a limited number of the individual productions appears in the final chart. The pupils were not assigned certain circles to be done. Each pupil was guided (if he needed to be) in the selection of his small circles in the light of the facts and principles comprised within the fundamental substance of the challenge. Uniformity is not essential in securing that objective. A glimpse of the ideal was caught in this adventure. It is something like this: The best assignments will not be made in formal ways; the best teaching will not be the kind of performances ordinarily so labelled. The spirit of creative procedure may not be described. One gets a scent of it in crossing and pursuing trails, now and then, in these prospecting parties of the new school. There is a hint of it in the case of the boy in another generation who made up his mind to become a lawyer, and went straight for some old-time lawyer to make his dêbut into the legal profession by sweeping the office where he found the books on the law, teaching him all they had to teach him without assignment.

Many other phases of the procedure in this challenge might be cited. The reader will be able to educe a score or more by applying the principles utilized in all the illustrations comprised within this chapter—a chapter which never can be finished. Any teacher, educator, or administrator who stops at this station has missed the point of the adventure. Any one who would try to retrace the steps in these journeys, in these charts, will lose the trail utterly. If teachers will dream and discipline themselves, triumphant heights may be attained. A chapter of this sort can be finished only in a closed world. Ours is a world of changes—an open world. Just a sense of possibilities, perhaps?

CHAPTER III

BLAZING A TRAIL FOR CREATIVE AND INQUIRING EDUCATION

In comparing the actual conquests and achievements of the human mind in the realm of science and invention with the pedagogy and practices employed in school and college, it would appear that our so-called education has remained in a primitive and rudimentary stage of development. Here and there we find promising experimentation intended to lift the child and student out of passivity into a deliberately organized procedure for the realization of some kind of liberating education. The easiest and most popular thing to do in these days of doubt and confusion is to set forth searching indictments of educational practice. It is another thing to take full responsibility for constructive thinking in exercising the right to criticise existing institutions.

The enormous complexity of the human brain has led to the creation of a new environment of mental images, emotions, ideas, forces, prejudices, ideals which may have little relation to the physical and material, but under the influence of which intelligence builds itself up and the mind becomes creative or moribund, progressive or stagnant. The self is literally the integration of organism and environment. Man is now challenged as never before to live up to and with his environment.

In the latter part of the last century a legend of three words, "Knowledge is Power," was wrought into the construction of the school desks where we sat. That old legend is fraught with implications and potentialities of world-shaking results. "Knowledge is Power" may be potential dynamite. The analogy of disarmament is striking. The arena for the next war (in the making) extends 40,000 feet in the air and encircles the whole earth. No defensive measures are in sight. Nations may regulate aircraft, set up ratios and the like, but nations are unable to control the production of poisonous gases. Is aircraft to be abolished? Disarm such a thrilling scientific adventure as aviation! If nations should resort to that extremity it would be the final act in the achievement of imbecilities. We have our new knowledge, our new forces, new responsibilities, new ideals, and we don't know how to live with them. What must be done is to demobilize and disarm the old irrational ideas, the old moribund methods, the worn-out and unsuitable solutions, the old acquisitive controls, cowardly cautions, dead dogmas, and sterile stereotypes and create, as Robinson declares, "*an unprecedented attitude of mind to cope with unprecedented conditions, and to utilize unprecedented knowledge.*" Education belongs peculiarly in this category.

To a complacent group, reared in efficient standardized mediocrity, it is a shocking thing to read a radically serious criticism of education (that saving elixir of our civilization). "It is now quite possible, in fact it probably has been done, for a boy to go straight through from his letter blocks to his Ph. D. with precisely the same kind of cooperation in the enterprise on his part that a sardine furnishes to the business of his translation from the state of innocence and freedom of his birthplace to the diploma-bearing tin on the grocer's shelf." * This stinging appraisal of our educational establishment will be heartily approved by all those restless individuals who hold the conviction that the system produces machine-made minds, disheartens originality, annihilates individuality.

Our adventure is not conceived in this book to be a cataloguing of destructive criticism. We propose to set forth at once impressive contrasts by means of which a new trail may be blazed up the canyon sign-posted, constructive thinking. Each individual —teacher and pupil—is to become a member of a prospecting party whose discipline is voluntarily suffered in the adventure of achieving cooperative results through recognition and appreciation of alternate forms of leadership and varied expressions of individuality.

Running throughout the entire school system the practice persists, in one form or another, of getting something said about a certain number of pages or exercises assigned to the learner with the expectation that what is assigned is to be learned and reproduced either as "memory work" or in a semi-rote fashion *with the books closed.* The recitation system in the lesson-hearing school cries aloud for just that performance. The lecture system requires substantially the same performance through the quiz master. The principle is essentially the same all along the educational highway. The student is being everlastingly reduced to the position of a recipient in the process. He is expected to acquire facts and information for a long, long time on the theory that one cannot think without *the* facts and also that one will (or may) think some time after the acquisition of facts. Such truths are, at best, half-truths very much overworked in defense of established routine and unchallenged tradition. The doctrine that culture consists in "*contact with* the best that has been said and thought in the world" (not of course in China, or India, or the Saracenic world)—that idea still influences the choices of subject-matter and reinforces the methods employed in the lesson-hearing school and in those *halls of learning* where lecturing is still the "most comfortable mode of respiration." In the inimitable phrasing of Slosson, "Lecturing is that mysterious process by means of which the contents of the note-book of the professor are transferred through the instrument of the fountain pen to the note-book of the student without passing through the mind of either."

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* Pearl, Raymond, *Scientific Monthly*, 25. Vol. 21, p. 34.

We are not far away from the Great Didactic written in 1632. John Amos Comenius was a modern pioneer. He wrote: "The teacher must stand on an elevated platform, and, keeping all the scholars in his sight at once, allow none of them to do anything but attend and look at him. He must imbue them with the notion that the mouth of the teacher is a spring from which streams of knowledge issue and flow over them, and that, whenever they see the spring open, they should place their attention, like a cistern, beneath it, and thus allow nothing that flows forth to escape." And the examination was created on the theory that the mind of the scholar, like a jug, was to be filled and then the contents should be examined to find out how much had leaked out.

We can force a child to passivity. We can perpetuate a formal repetition of second-hand knowledge. We may go on with subject-storage processes. *Or*, we may shift the emphasis to creative and inquiring types of education.

In the old way:

> Once there was a miller that was very poor, who had a daughter that was very beautiful. It happened one day that he met the king. Wishing to make the king think he was of some importance he began to boast about his daughter. Etc.

The lesson is assigned—class excused.

The next day the "class comes to order." The lesson is executed. The pupils may be kept in order "reading round" than which no better device could be conceived to promote idleness. (A sorry waste of time and energy is found in high school in "reading round" themes and "reciting round" in general.) If the pupils are in order and if they "pay attention" and if no mistakes are made and if no dangerous dogmas are violently discussed, the inspector (frequently a "suspector") is constrained to call it a good school. Questions will be asked on the lesson (*with the books closed*) such as, Who dragged whom by what around the walls of which when how many times?

1. Who are mentioned in the story?
2. Was the Miller wealthy?
3. The daughter was beautiful. (True or false?)
4. What did the Miller say to the King?
5. The daughter could spin ...... out of .... (completion test).

Such so-called questions are often asked at the rate of one hundred or more during a single class period of forty minutes. A vast amount of pedagogical detective work is done in submitting questions to discover whether or not the student has read the book. Pupil after pupil is admonished to stand up, recite, (shut up), sit down. If the supervisor is present the rules of "pedagoguese" are observed, such as "calling on all the pupils to recite," "asking the question before naming the victim," and the like. If there is enthusiasm (but not too much) and "interest," it is pronounced a good school.

There is a morass of routine about it all. One wonders to what extent studying "lessons" influences one's thinking. The main criticism of the conventional procedure is the fact that the learner is induced to become a passive agent in the absorption and reproduction of facts and ready-made conclusions. *The pupil too often learns lessons and not a great deal more*, to use Morrison's penetrating analysis of the situation. Or, to give the little boy a chance to say it in his salient, if disturbing, manner: If you are studying arithmetic, you learn how to solve problems you don't need to know unless you are studying arithmetic. As a matter of fact, there is a strong suspicion that learning French or German by means of "lessons" (a page at a time) is a perfected device in the achievement of incapacity to read and enjoy the language. Something has happened to the student educated in the choice examples of good literature. They too have been pursued according to the little boy's explanation of his arithmetic.

In the new school:

Note the procedure. Teacher and pupils work on a partnership basis. Collective teaching loses its old formalisms. In the exercise below, no assignment has been made in the usual form. Pupils are not told the story (or parts of it) or asked to read it with any expectation of regurgitating it piece-meal. All on their marks! Data (*D*) are furnished in order to stimulate thinking (not reproduction). Questions (*Q*) are fabricated upon the basis of which each pupil is given a chance to move. The ball is served in order that it may be returned. The teacher moves so that the boys and girls across the chess boards may be challenged to move on their own account. The story in this illustration is *progressively created* by each pupil (each in his own tongue in a way) in a "free"-controlled environment. Not all the *data* or all the *questions* in any given stage of the development of the story are included. The whole thing is suggestive. It is not a formula to be followed, or a prescription to be filled.

RUMPELSTILTSKIN

(Procedure: Usually the data should be read by the teacher or some member of the class. Pupils may write their reactions or a socializing discussion may be conducted. Data may be arranged for written work covering an entire story.)

D. Once there was a miller who was very poor, but who had a daughter who was very beautiful. It happened one day that he met the king. Wishing to make the king think he was of some importance he began to boast about his daughter.

Q. What would interest the king?

D. Among other things he said she could spin straw into gold.

Q. What would the king say to that?

D. He took the maiden to his castle, put her into a small room with a spinning-wheel and plenty of straw, and locked the door.

Q. Why would he lock the door?
Why would he keep the key himself?
Why do you suppose he told her she should die if the straw was not spun into gold by sunrise?
Who would deserve the punishment if she should fail?
What would the poor maiden do?

D. She was in despair and wept bitterly, when suddenly the door opened and a queer little man entered.

Q. What would he ask her?

D. When he heard what the trouble was, he said he had magic power by which he could spin straw into gold if she would give him her bracelet.

Q. What would she do? And the dwarf?
What would the king do the next morning?

D. That night he put her into a larger room with more straw.

Q. What would happen that night?

D. She gave the dwarf her ring. The third night the king put her into a still larger room and said that, if she spun all that straw into gold, she should become the queen.

Q. What would happen that night?

D. But the maiden had nothing more to give.

Q. What could she do?

D. Finally the dwarf said that he would do the spinning if she would give him her first-born child when she became queen.

Q. Why do you think she might be willing to make such a promise?
After the promise what would the dwarf do?
What would happen the next day?
What would make the queen forget the promise?

D. One night after a year had passed and a beautiful little child had been born to the king and queen, the dwarf stepped suddenly into the queen's chamber.

Q. What would he say to her?
What could she do?

D. He did not want gold or jewels: he wanted the child; but said that she could keep it if she could find out his name in three days. He offered her three guesses each night.

Q. What would she do?
When he came the next night what would he say?
What would the queen say?
What would she do all the next day?
And the next night?

D. On the third day the queen's messengers returned. One of them had crossed a high mountain and had come into a deep wood where the foxes and the hares wished themselves good-night. Here he found a tiny little house and saw before it a fire burning. Hopping round the fire on one leg was a most ridiculous-looking little creature, who cried:

Today I brew, tomorrow I bake,
Next morning I shall the queen's child take;
How glad I am that she does not dream
That Rumpelstiltskin is my name.

Q. What did the messenger know?
What would he report when he reached the palace?
What would the dwarf say the third night?
Why would the queen ask other names first?
What would she say for the third guess?
What would you expect the dwarf to do?

D. Rumpelstiltskin was so very angry that he just flared up and went out like a candle.

Q. Why do you suppose the fairies did not allow Rumpelstiltskin to take the child? *

This elaborate illustration is presented as a point of departure. The movement is never to be regarded as a shift from one closed, inflexible method to another. The procedure contemplated in this shift of emphasis suggests flexibility. Every teacher, and every pupil, is encouraged to "follow the gleam" in a free field ahead. As we have so often urged, an opportunity is provided for *freedom in work.*

In this illustration questions do actually get themselves in front of some potential answers. The puzzle stage of schooling is quite clearly transcended. Stories will still be told and read for entertainment and for creative self-expression. Yet a distinguishing teaching situation that offers opportunity for creativeness will be held in proper perspective.

At all events, in the new school and the new college the student's mind must produce. What he studies will influence his thinking. It is frankly proposed to create a habit of mind, to achieve a competent mind, to come into the possession of a mind by deliberately organizing the means and methods of creative and inquiring education.

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* Adapted from Hall and Hall, *The Question As a Factor in Teaching,* Houghton Mifflin Company.

The distinguished painter in a Paris *atelier* illustrates in his procedure the new way of teaching. A large class of fifty students or more are there. Each, at his easel, works forward within some guide lines or principles. The teacher may set in motion the study by a brief presentation of certain principles to be observed. He may illustrate the general idea of the challenge. Little time is spent in mere "talk" or exhortation. The central fact is to produce. The teacher passes from easel to easel and assists with a "stroke of the eye," a suggestion here, a helping line there, an encouraging remark, a comment showing how to improve a pupil's painting, citing references for fecundation of a pupil's mind producing meagrely, calling attention of a group or the whole class to a guiding principle, exhibiting his own artistic capacity in a short chalk-talk at the board or canvas, bringing together (for purposes of judging and sharing) productions of pupils—in brief, directing activity in a going concern is the new task of the teacher. In the work periods, now becoming creative, there will be opportunity for each pupil to receive constructive criticism of his own work. There is a universal principle of pedagogics suffusing this whole procedure from the kindergarten to the university. The master teacher will know what he wants to have produced. His technique may appear to be a severe and exacting discipline, yet within it a perfect freedom for every earnest producer. It will require a rigorous scholarship, a vital sense of mastery, a courageous responsibility to teach in the true way as does this teacher—the painter.

A projected ideal of true teaching is one of the most potent factors in the new environment. To live *up to* and *with* this new environment requires the most exacting self-discipline. The new teacher will create for himself a flying-goal in the pursuit of which he will so organize his procedure as not to be ashamed of any day's work. He will be as eager to enhance his own self-esteem by genuine endeavor in the absence of visitors as he would be tempted to "put across" some kind of spectacular performance by spurious efforts in the presence of visitors (a performance, called in the "gay nineties," the Herbartian Hippodrome).

The transition to the new point of view is always difficult to envisage and to realize. Illustrations may assist us in the adventure. In a normal college one summer an amiable "educator" was working for a week in a professional capacity. He was asked to go over to the "Model School" and *see* what was going on. He found a class in arithmetic, third grade—fifteen little boys and girls—offering themselves as a vicarious sacrifice to the cause of teacher training. A critic teacher, six senior cadets on the road to certification, and the director of the training school were there. The class came to order nicely. The boys and girls were thoroughly regularized, domesticated, and civilized. The first question came from their critic teacher: "How many of you solved the problems I assigned you?" (It was a home assignment of eight problems in addition in third grade arithmetic *in the summer time.*) Some of their hands went up; some did not. The cadets were taking notes on what they thought would help them teach school the next year.

The visiting "educator" who in his early experience had taught several country schools requested the privilege of taking charge of this class in the "Model School" just as the critic teacher was getting ready to hear the children recite *the "Lesson," with the books closed.* His first move was to ask a little freckled-face Irish lad in the front row if he got the problems. "Yes," he said buoyantly, "'Ma' got 'em!" (It is pertinent to remark in passing that about 15 per cent of the mothers of ninth grade boys and girls fail in English and approximately 25 per cent of the parents and other relatives and friends fail in algebra in the same grade.) This little boy was asked if he thought he could go to the board and make (create) some problems just as good as those his teacher had assigned him. "Sure," he said, and to the board he skipped. (The school boy, a highly specialized product, disappeared and the natural boy, "Mike" in the making, got into action.) Susie was asked how she got on. A bit timidly she squeaked, "I don't know." Johnny was asked to go to the board with Susie and to find out what he could about Susie's achievement in the miracle of addition of numbers consisting of not more than three digits. (The assignment comprised that sort of material.) "Mike" was spreading himself at the board, climbing up steadily into dizzy figures of more than three digits. (The critic teacher with her auburn hair, the symbol of loyalty, observed "Mike's" expansive performances, and dropped a word of caution to the visitor to the effect that the course of study prescribed the limits of *the "ground to be covered,"* a solidly intrenched stereotype. Numbers beyond three digits were reserved for the fourth grade.) But "Mike" went on. Pretty soon he was asked if he could think of anything any boy or girl in the class might do. "Yes," he shot back, "let Tommy, that lazy fellow over there, come and add 'em up after me." And at that a college senior was working with Tommy, seeking to discover the secret of such teaching power as that exhibited by the eminent Leipsic pianist who called on one pupil after another to play a piece, giving each one thoughtful and helpful criticism. In a moment Johnny was operating on Susie in another part of the room, saying with characteristic teacher fervor, "Susie, don't you know, 9 and 5 never did make 13?"

In a brief time every pupil in this "model class" was at work. The concept or idea of addition was being pursued vigorously. The limited and limiting assignment was effectually put aside. The central idea was focused upon and each pupil was stimulated to work forward within this unifying idea—called *addition*. "*No upper limit*" in adding was substituted for the "lesson" on addition. "Mike" and Johnny were assisting in the making and the negotiating of the curriculum, and they were not alone in those enterprises. They took to it like ducks to water—a test that will remain valid and valuable after many of the new tests have passed away.

The senior cadets were seated out on the rim of this classroom. They were perched out there to observe and to learn how to teach. They were apparently *in* the class but not *of* it. As soon as "Mike" and Johnny and Tommy and all the rest of the little folk were getting well under way in this procedure of *producing* instead of *reproducing*, these college seniors were invited to come down off the bleachers, remove their pedagogical "duds," get into the stream, as it were, and try to find out something about the working of the minds of these little people and of their own that would be as significant as the discovery that Johnny made concerning Susie's predicament over her 9 + 5 combination. The short class period of thirty minutes was soon gone. The schedule was smashed, however, and the game went on for another thirty minutes.

It would seem to be within the bounds of truth and propriety to remark that these fifteen kiddies in the "Model School," together with the critic teacher, the director and the six college senior cadets, went from the class that morning as from a refreshing bath with the pores of the mind open. The tissue of ideas involved in the business of preparing teachers for twentieth-century education presents a major problem in our thesis. The thing simply cannot be done by doing the old things with new labels attached. The "critic" teacher (perhaps "critic" is a stereotype to be discarded) will not retire from the game and allow the "cadet" teacher to "muddle through," mostly "muddle." The prospective teacher in the new way will not be permitted to occupy a bleacher seat as a spectator. The law may be formulated for the new procedure: In teacher preparation, two negatives are equal to an affirmative, canceling each other. Prospective teachers need something more than rules of pedagogy and pseudo-problems raised in an academic atmosphere to prepare them adequately for creative teaching tomorrow. Something approaching *an attack of realization* on the part of two of the six cadets was detected in a vigorous discussion that followed hard upon the episode just cited.

In another book by the writer entitled *Directing Study** numerous suggestive examples illustrating similar procedures are described.

A university professor changed his procedure. He had been delivering lectures in history to some three hundred freshmen and sophomores in a large commonwealth university. The well-known method of forming quiz sections under quiz masters had been adopted. Much complaint concerning the intelligence and preparatory work of the students was heard about the campus. It was open season on the high schools ten months in the year. One of the popular indoor sports of college professors is to attribute a large measure of their own failure with students to faulty high school preparation. As a result of mental testing an obsession, that only about two out of a hundred freshmen have adequate mentality to do university work, received a new impetus. This particular professor, an outstanding teacher with notable research achievements, began to examine his own procedure to ascertain, if possible, to what extent the system which he was using might be a determining factor in the results he was obtaining. He challenged the lecture system in the form he was using it. He searched into the methods employed by his students in dealing with the assigned readings and the examination. He began to be impressed that he was conducting a "phrase factory." The students were giving back certain terminologies, facts, and conclusions which they kept in bonded storage to be used on special occasions. True, not a few of his students were learning history. The point of it is that he cleared the way for an experiment.

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* Miller, H. L. *Directing Study.* Charles Scribner's Sons. Chapter I is composed of suggestive procedures.

He went out into the high schools seeking his assistants from successful teachers who might be interested in the pursuit of higher degrees. One such assistant, giving half time, was chosen for each group of fifty students in the course. A room was fitted up with shelves and tables—a history laboratory. Books, maps, bulletins, and other materials were placed in this laboratory. The students were divided into working groups of about fifty each, selecting their hours so that a double period could be had in this room. A period from 7 to 9 P. M. was arranged. An assistant was allocated to each working group.

With a professor now who was finding an emerging unity out of teaching and research, and who was prepared to include the student on a participating basis in the new adventure, with assistants who were successful teachers and not far removed from the freshman and sophomore in college, with a laboratory equipped for effective study and some researching, at least, the new procedure was initiated. The students were to *produce* chapters as well as read ready-made chapters. That is, they were to organize their study in terms of some challenging problems. They were to work under a plan of directing study. Unifying principles or common multiples were employed within which a great variety of patterns could be designed. Phases or aspects of some central unit of learning or of some creative problem were chosen by the students for their chapter or thesis headings. In this laboratory with materials available they spent two hours a day.

The professor did not disappear. Rather he went on "lecturing," but the purpose and intent and fashion of the business were changed. It might be a ten-minute talk before a group or an hour before the combined groups. *His lecturing function was not regimented.* There were many ways by which he made himself an invaluable factor in the experiment. What he "delivered" in his lecturing function was not intended for immediate consumption or cold storage by the student. It was deemed a profitable thing to discuss with the students the general principles involved in the problem at hand. Guidance in the use of materials was included. A stimulating lecture to the combined groups, *occasionally*, in which the intelligence of the student was respected was in order. It might be the part of wisdom to spend two hours before a group illustrating methods of organizing materials, explaining ways of using source materials in the production of original work. (i. e., *The students had a chance to see a master mind at work, now and again, in that intimate sense which genuine participation suggests.*) Notes on the "lecture" were raw materials, in a way, which were to be used to stimulate imagination, arouse curiosity, direct the search, guide the amateur, promote the activity of the worker, assist the producer.

One new function of the professor was to act as a "catalyzer" for the students, hastening the reactions produced by the new combination of substances—books, notes, charts, "lecture." The metaphor ought not be pressed too far. One essential function of the student is to keep the professor "educated." In other words, true education does not consist in delivering to the students the results, the achievements, the organized products created by the professor or the book; but true education is to be realized in the *process* of achieving those forms and conclusions which are so generally regarded as materials of instruction. Lectures are "delivered"; so are groceries and hay.

The professor was accessible as counsellor not alone for the student producing meagrely but for the promising student developing a flair for history.

He came in contact with the individual in various ways. It is not inconceivable that even a "green" freshman might assist the professor in some bit of significant research. To be recognized as a partner in research *magnificent* might be the means of creating a new attitude toward scholarship.

The assistant stands in a teaching relation in the new order. He is there to be consulted, to act as a consulting expert, to check results, to guide the group, to assist the individual. He is not denied the opportunity of "lecturing." He has his chance. But the purpose of such function is precisely the same, in general, as that exercised by the professor. What he presents is intended to be grist for the students' mill or pigments to be artistically integrated into the pictures the students are producing.

The situation was not without its problems. Any student who failed to get on was taken in hand first by the assistant. If the patient did not respond to treatment by that "expert," he was sent to the professor. In that conference it was the aim of the professor to discover whether the malady was due to loafing and indifference or to a failure to know what to do and how to do it. If the diagnosis proved to be the former the student was given due warning that he must reform at once or be dropped from the university. It was perfectly possible to discover the status of every student, *as to intention at least*, within the first three weeks of the semester. If the professor found that the student did not know how to study, that he was confused and baffled in the enterprise, the procedure was designed to help the student find a way out of his dilemma.

Another university professor, interestingly enough a professor of psychology, changed his procedure by applying the principles of *Directing Study* and the *Contract Plan.* Two concentric circles (instead of three, p. 52) were drawn. Four marks—*A*, *B*, *C*, *D*—were employed. Two assignments, integrated, were developed. The assignment comprised within the inner circle (designated *x*) was presented as a basis upon which the marks of *C* and *D* were earned. The extended and deepened assignment comprised within the outer circle (designated *y*) was developed for the *A* and *B* marks. The *y* assignment included the *x* assignment and was organized in the light of the three principles described in previous discussion (p. 66). To earn a mark of *D* the student had to attain 80 per cent of complete mastery in the *x* assignment. To earn a mark of *C* the student was expected to attain 90 per cent of a complete mastery in the same assignment. To earn a mark of *B* the student had to attain a mark of 90 per cent in the *x* assignment and also a mark of 80 per cent in the *y* assignment. To earn a mark of *A* the student was aware that he must maintain a mark of 90 per cent (complete mastery) in the *x* assignment and a mark of 90 per cent in the *y* assignment.

The students in this course not only elected the course, but they also *elected* the mark (*A*, *B*, *C*, or *D*) which they proposed to earn. This choice of the mark was made at the beginning of the contract assignments. The professor writes: "You may care to know that I am teaching psychology now for about the twentieth year (about 5,000 students in all), and I am certain that I am getting better results this semester than I have ever gotten before. *Ninety per cent of the class have taken the* y *contract, and I hear less complaint now than ever for working my students too hard, for they themselves have made the harder selection.*" The departure yields fruitful suggestion and sound inference. There is "good psychology," as we say, in the technique. Comparatively few students would make deliberate choices in advance of the journey that would be tantamount to announcing themselves as intellectual loafers, aggressive swats, painstaking idiots, complacent dunces. The fact that 90 per cent *elected* the *y* assignment is highly significant. It may be that the *"get-by" attitude of college students*, so generally complained about, *is a form of the function of the system.* A challenge to one's powers does make a difference. When it is known what it means to attain definite goals, a far greater number of students rise to the occasion as if to the manner born. One thing seems to be universally true—there is no difficulty with reference to the marks pupils and students receive in all of these experiments with the *Contract Plan.* Everyone knows what he has *earned* and no one feels that his grade is something *given* him by his teacher or professor. In another experiment a remarkably good high-school student in French gave an illuminating reply: "Why, wouldn't I be foolish if I liked the *Contract Plan?* I have to do ever so much more work! Why, I get a *C* now on the same amount of work that used to give me an *A*. But no one could deny that you learn much more. It surely is a much better system of teaching." This charming girl had acquired protective coloration in a system of schooling which permitted her to cuddle up in the approval of her teachers by means of which her high marks had been secured. Her own comment implies an indictment of old practices and points the way to more wholesome procedures.

Our professor of psychology is not victimized by any such stereotype as the bell-shaped curve of distribution of college marks. He makes scientific distinctions in his thinking and teaching in dealing with these three propositions: (1) *The doctrine that bodies are rigid is a highly sophisticated one.* (2) *The discovery that bodies are not rigid is due to measurement.* (3) *Measurement depends upon the use of number scales and ratios which must be assumed to be rigid.* The ability to hold these three propositions in proper focus is, without question, *the* most difficult task confronting teachers, school administrators, and scientific experts in education. These three propositions should be tied together, perhaps learned "by heart," and repeated conscientiously whenever the classificationists begin to operate on boys and girls. The little child is aware that a bold assumption suffuses his problem in arithmetic: If three dogs are worth $30 what are five dogs worth?

It is the assumption of the equality of dogs. The child knows that his own dog is invaluable—in fact, worth more than all other dogs in the kingdom. It is a dangerous thing to give people the multiplication tables. But it is a more dangerous thing not to continue the teaching of mathematics until the mathematics of relativity is comprehended.

The critic may contend that we are twisting the situation to suit our theory, or that we are merely rearranging our prejudices. It may be fairly contended that a great teacher could do all these fine things under any system or method; that it is after all a matter of personality, or something which lies outside and beyond experimental control. Be that as it may, it will no doubt be conceded that one's philosophy has a good deal to do with *method* in the deeper sense.

No extravagant claims are being made for a new procedure. The main argument bears on a shift of emphasis for the student. Somehow he is going to be transformed from a recipient and a spectator in respect to lectures, books, radio, art, science, music, games and the like into an active producer not only of his intellectual life, but of his recreation, his self-respect and even international good will, by using creatively lectures, books, radio, art, science, music, games. None of these things can be *bestowed* or purchased. They must all be *achieved*.

What the ultimate outcome of such a shift of emphasis may be we are not disposed to prophesy. Instruction as a means of communicating belief is one thing. Education conceived as a task in creating minds capable of analyzing problems in the light of facts is another thing. If the defenders of the *status quo* are satisfied with the results, convinced that the product of the school and college is up to standard as we say, the argument for them is closed, and experimentation is not only futile but dangerous.

What is the situation? To what extent have education and other social forces equipped mankind for the productive use of the evolutionary products made available by institutions and science? "In so far as the vast majority of us are equipped with anything resembling an outlook on life and the world, it consists of a substratum of superstition about the supernatural, a smattering of social theory, a nest of group prejudices, a few wise saws, a rumor or two from science, a number of slipshod observations of life." * Man's life has been, as Hobbes surmised, "poor, nasty, brutish, short." Much remains to be done to achieve Bertrand Russell's *Education and the Good Life.* In moral and educational progress we are much nearer the beginning of it than the end. The innate conservatism of the human race has been emphatic in education. Progress since 1850 has been notable, and the emotional appeal of science is now giving impetus and zest to possibilities of novel and marvelous discoveries in the field of education. Far-flung horizons are being sensed. A downright sporting glow is being kindled in the contemplation of projected experimental programs.

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* From M. C. Otto's book, *Things and Ideals,* an invaluable book for teachers and educators seeking a philosophy of life and a way of interpreting social, economic, and religious forces.

The genius of organization lies in capacity for revision of ideas and in a sensitiveness to growing possibilities and changing needs. There are no automatic safeguards handed down from yesterday's custom. Some day the old custom jerks and bolts and goes on again in a modified form. A deliberate organization of the mechanism for the effective transmission of the evolutionary products of civilization has yet to be projected. The hope of a better world lies in freedom to experiment. Through courageous experimentation man's mind has been liberated in the invention and construction of new machines and synthetic products. In brief, the metal age is a creative age in man's development.

But what of human nature in any searching educational reform? That vision of the latent goodness and regeneracy of human nature which guided the nation up to the last decade has been somewhat blurred. The theory of the unlimited power of education is being seriously challenged. Regardless of a wide distribution of economic opportunity, a sense of social responsibility, and some kind of liberating education, it is quite generally maintained that vast numbers of children are born incapable of being educated beyond the merest rudiments and a modicum of vocational education at a comparatively low level.

J. S. Mill declared: "Of all vulgar modes of escaping consideration of the effect of social and moral influences on the human mind, the most vulgar is that of attributing the diversities of conduct and character to inherent natural differences." That doctrine has been vigorously assailed during the past decade. The eugenists and one large and influential school of psychologists have created quite the opposite view. The mind of the crowd has been influenced by a copious production of the literature of despair. A popular belief prevails that the human mind can be accurately measured, and that a definite intelligence quotient, correct to a decimal fraction in the number scale, can be affixed to each individual with a certain finality that there is an heredity "that shapes our ends rough hew them as we will."

But winds of doctrine change. Just now "infantile environment is beginning to replace heredity as the passing deity of science." The "unit characters" of Gregor Mendel are no longer acceptable to the geneticists. The behaviorists are moving an amendment to the declaration of the founding fathers so that it will read as amended, "All men are created equal *at birth.*" According to Dendy, Pavlov, Guyer, and others qualified to give expert testimony, it appears that Weismann will be retired from the throne and Lamarck reinstated with a new emphasis on the transmission of acquired characteristics.

Even more challenging than the sudden shift in the changing current of thought in the biological field is a word from Sir Henry Gauvain, superintendent of Trelear Hospital, in reporting results of ultra-violet light treatment of physically defective children. "It is not our object to aim a blow at the solidly founded theory that intelligence is innate and cannot be increased. It is probably quite indisputable that an individual's amount of mental energy is fixed and unalterable. But it is unalterable in the same way that the maximum power of an engine is unalterable. An engine of a maximum of 40 horse power can by no trick be made any more powerful. But the ways are legion whereby it can be less powerful . . . a dirty sparking plug, a faulty magneto, dust in a delicate piece of mechanism . . . any of these things, and many others, may reduce its power far below 40. It is suggested that the case is no different with mental energy. We advance the suggestion, which further investigation may confirm or disprove, that ultra-violet light, shown to be an important factor in tissue change, may thus improve the nutrition of the gray matter of the brain and in this way increase the output of mental energy which we claim follows judicious exposure to light. In a more exact test, while the physique of those receiving light treatment showed improvement as compared with the others, the effect on the mentality was even more definite. Those exposed to light were markedly happier, more vivacious, more alert, and I may add, more mischievous." We may be approaching a new epoch in clothing. Rayon and artificial silk are more permeable than our present fabrics to the ultra-violet rays.

Who has the imagination to predict what lies just around the corner in this intriguing business of throwing the torch of science into the jungle of mystery? It surely is not the time to rest *in statu quo* as if we had penetrated the insides of human beings, not our livers and lights, but the places where the mysteries are. In addition to the brilliant report of Sir Henry (and the synthetic chemist) an arresting account of the possibilities of pre-school education has been formulated. The effect of creative stories, art, music upon mentality in these early years can scarcely be appreciated. It would be difficult to conceive the levels of intelligence that might be attained through productive forms of guidance in self-expression.

And yet there is a sort of creeping pedagogical paralysis making its way into our schools. Why try to educate all these weak-minded souls, morons, aggressive swats, and the like? Their IQ's are too low for this curriculum, that stage or level of education, *my subject!* Besides, why try to educate the "masses"—(a peculiar persistence of status)! There is no denying the fact that a good deal of skepticism has developed concerning the desirability of "exposing" a very considerable number of students to high school and college education.

That the testing movement has given impetus to this skepticism is an opinion frankly expressed by many students of contemporary movements in education. The thing got out of the experimental laboratory where it gave promise of large contribution and was broadcast as a ready means of classifying human beings. It was caught up in a very general mania for standardized results and standardized patterns by which things of the mind could be regimented as things in the business world are. The whole situation is extremely complicated. It is difficult to disentangle the elements. Popular opinions about measuring intelligence constitute one phase of a real problem of social welfare. What is "intelligence"?

It may be well to pause for a moment and examine this generic or trade name for tests called "intelligence."

Thorndike. "The power of good responses from the point of truth of fact is the *intellect.*"

Henmon. "Capacity for knowledge and knowledge possessed."

Peterson. "A biological mechanism for adjustment and control, unifying the effects of stimuli."

Dearborn. "Capacity to profit."

Haggerty. "A dynamic, behavioristic concept; native capacity; thinking or reasoning as well as ability to deal with novel data."

Pintner. "Ability to do all sorts of things."

Sellery. "Four years of Latin is one of the best intelligence tests extant." [Endurance is no doubt a vital part of this test.]

James. "Let us make this ability to deal with novel data the technical differentia of reasoning.

Colvin. "The productive use of mental powers."

Terman. "The ability to think in terms of general ideas."

Freeman. "Capacity to learn."

Pressey. "*Simply a working hypothesis.*"
[Are instincts data or hypotheses?]

Cooley. "The test of intelligence is the power to act successfully in new situations."

Hart. "A *function* of mental life in crises. *An individual who has problems may have intelligence.* One who has no problems will never have intelligence."

An Endocrinist. "Three and one-half grains of thyroxin are all that lie between intelligence and imbecility."

Intelligence tests have been constructed with no very clear definition of *intelligence* itself. Teachers and administrators who attach more or less significance to the results of mental testing will be interested in reading Thorndike:

"Existing scales for measuring intellect, although better than those used a generation ago, nevertheless are not free from two serious defects: First, the units of measure are arbitrary, so that we do not know how far we have a right to treat *scores as numbers*, and to add, subtract, multiply, divide, and compute ratios with them. Secondly, we do not know how much of intellect these scores measure and how much they are contaminated by factors outside intellect." . . . "The same test may be for one individual a measure of his *level* of intelligence, for another a measure of his *range* of intelligence, for another a measure of his *speed* of intelligence, and for another a measure of his *method* of intelligence." *

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* Thorndike, E. L., *Journal of Educational Research,* January, 1925.

There will be no dissent from the guiding principle that we ought by all means seek to reduce phenomena (including the mental) to mathematical scales, but we ought not take them too seriously when we do it, especially in these intangible and undefined and uncharted areas of intelligence.

Terman says: "The tests do not measure simon-pure intelligence but always native ability plus other things, with no final verdict yet as to exactly how much the other things affect the score."

And Cyril Burt, the English specialist in the field of measurement of intelligence, attributes about 33 points in 100 to native capacity, maintaining that a large fraction of the total score is the result of schooling.

These citations will suffice to indicate that we do not have a measuring rod of intelligence that can be applied with a high degree of certitude. Subsequently we will return to this controversy and try to show the nature and the value of working into the theory of probability. At this juncture we desire to present a promising departure in mental testing as a phase of the blazing of the trail for creative education.

Dr. Strasheim of the University of Stellenbosch, South Africa, has made a fruitful study of mental testing. Examples of situation-tests, *A* and *B*, p. 152 ff., are selected from his book.*

"*Before any test of 'intelligence' is made up, such construction must be consciously and consistently*

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* Strasheim, J. J., *A New Method of Mental Testing.* Warwick and York, Inc.

guided by a clear conception of what 'intelligence' is taken to mean."

There is nothing startling about this statement for the scientifically trained man. That a clear definition of precisely what "intelligence" is, or a definition of what phase of intelligence is to be measured, has not been made, is perfectly obvious. Needless to remark, that the tests have not been constructed in the light of such clarifying definitions. If a test is designed to measure just mechanical memory (*i. e.*, to test patients suffering total recall) the construction of the test should be consistently guided by a clear conception of what that "intelligence" is. If associative memory is to be measured a different sort of construction will be required. An enumeration of the phases of "intelligence" would require several pages, if not reams of paper.

Training in "relation eduction" is a starting-point in Strasheim's experiment. The testees are trained carefully to educe a particular kind of relation or evidence. *Educing* from "fundaments" some correlates, or relations, or attributive relations is for him a tentative definition of "intelligence."

1. "Any lived experience tends to *evoke* immediately a knowing of its characters and experiences."

2. "The mentally presenting of any two or more characters (simple or complex) tends to *evoke* immediately a knowing of relation between them."

3. "The presenting of any character together with any relation tends to *evoke* immediately a knowing of the correlate character."

Upon these criteria the following situation-tests are constructed. The person most immediately concerned with researches into "intelligence" is the teacher.

In order that the theory in question may become conscious of itself in practice a teaching situation should be made the setting for a demonstration. There is no disposition to speak disparagingly of the scientific psychological laboratory. When the X-ray was discovered, a popular belief (not without cause of origin) spread that a cure for *cancer* was at hand. The belief was soon dissipated. Patients are still X-rayed. The use and value of the discovery are established in medical practice. The Intelligence Quotient was invented in the laboratory. It got out and everybody is being *IQ-ed* for *classification*. It is the set of ideas and forces buttressing classification that should be demobilized. "Classify him! Classify him! and they classified him!" In that revised version we are finding the real difficulty. The use and value of a scientific experiment or discovery are not to be confused with programs. Everybody may be, perhaps ought to be *IQ-ed* for other purposes than classification.

These situation-tests are rather a novel organization of units of learning with creative intention. They are very different from those tests made up of a miscellany and administered under the propulsive mechanisms that have been brought over to the schoolroom from the factory across the street. Miscellaneous and unrelated encyclopedic information is not called for. The puzzle-conundrum type of statement is not included. A sequence is presented. Something is laid as a foundation to build on. The design is to secure higher and higher levels of "eduction" in a related series of situations.

The testee is placed in a learning situation and is furnished data to think with and some discoverable hypothesis to organize his thinking. The teacher is there not to tell but to stimulate and suggest perhaps. The testee may come to the teacher for legitimate assistance, receiving such responses as "And then, and then," . . . "Try it, and see." . . . "Does that seem suitable?" and the like. The old urge of the teacher to tell what he knows is to be restrained (even suppressed) at all costs. In these tests a mere reproductive association would indicate a low "intelligence." A "conceptualization" of the *messenger-idea* in the second test, an abstraction of that idea by the testee so that each new situation could be met with that mental control, would indicate growth in "intelligence," meaning by that ability to *educe* "*higher level*" relations. These tests are for little children five to ten years of age. (Adults may not march through them without pause.) The author sees in them a method of measuring mental performance. The only dichotamy suggested is *B* (bright) and *D* (dull): For the older dulls (O. D.) and the younger dulls (Y. D.), for the older brights (O. B.), etc. There are differences, to be sure, suggesting the possibility of applying arithmetical scales to express relative positions. That may be done if the investigator so chooses. Here the main point is to see the testees reacting at such levels as the pure perceptual (*i. e.*, by empirical concretes), associative reproduction (mere association by contiguities), on up to the conceptual ("abstracting" the isolable idea that becomes the psychological key to all the items in a given test). The testee who habitually reacts to nothing higher than a direct perceptual level is likely to be regarded as showing evidence of low "intelligence." The testee who consistently rises to effective "conceptualization" of the "air-excluding idea" in *A*, and the "messenger idea" in *B* (these being the basic "eduction-relations-concepts") may be regarded as exhibiting a high degree of intelligence although he may fail in certain items, due to experience, knowledge, temperament, insight, and the like with respect to particular items in the situation.

Moreover, in the shift from *absolutism* to *evolutionism*, "*there is no property ABSOLUTELY essential to any one thing*. . . . The properties and meanings of things [and situations] we hit upon characterize *us* more than they characterize the thing we are *naming*. . . . Classification and conception are purely teleological weapons of the mind." (William James.)

SITUATION–TEST—A

(The marks, /, //, suggest pauses to be made in reading.)

1. One day some Boy Scouts were camping out/ in a small house near the sea.// They used to cook their food/ over a fire outside the house.// When they left the house for the

day,/ they always used to *put out* their fire.// One morning they had no water to put out their fire.//

Q. What did they do to put out their fire?

They looked around, saw the *sand* on the shore,/ fetched some/ and threw it on the fire,// and so they put out their fire.

2. One day some Indians were sitting round their fire on a *rocky hill.*// Suddenly a scout came to tell them/ that their enemies were near by.// They had *of course* to put out their fire,/ as otherwise the enemy would see them,// but they had no water.

Q. What did they do to put out the fire?

3. Tom and his little sister/ were playing in an empty room/ one cold winter's day,/ when the little girl/ who had stepped too near the fire/ suddenly screamed.// Tom looked round/ and saw that her clothes were burning.// There was no time to get water.

Q. How did Tom get the fire out?

4. One day a number of wagons were standing at the side of the road.// They were bringing back goods from the town for the farmer,/ and had also a large number of *bags of flour.*// The drivers had made a fire to make coffee,/ and were just getting ready to go,/ when one of them saw/ that a box of books he was bringing home,/ was starting to burn.// There was no water to put out the fire.

Q. What did they do to put out the fire?

SITUATION–TEST—B

1. Mr. Brown is very angry with Tommy Smith/ and says that if Tommy *dares* to come near him/ he will give him a *good thrashing.*// One day Tommy is out in the fields/ with his little brother/ when he sees some men stealing Mr. Brown's apples.// He *must* tell Mr. Brown/ but is afraid he will get *a thrashing.*// As he cannot go *himself*// he sends his little *brother* to tell Mr. Brown.

2. The next day/ Tommy and his little brother/ were

playing in a meadow/ when they saw some boys stealing Mr. Brown's hay.// Tommy *must* tell Mr. Brown,/ but is afraid he will get a thrashing.

Q. What will Tommy do?

3. Once there was a farmer named Jones,/ who was *so* angry with a little boy named Harry Wicks/ that he said he would give Harry a thrashing/ *if he caught him.*// One day Harry saw a man stealing the farmer's fruit.// He *must* tell the farmer,/ but is afraid he will get a thrashing.

Q. What will Harry do?

4. Mr. White is very angry with little Teddy Robbins/ and says that if he *dares* to come near him,/ he will give him a *good thrashing.*// Teddy has no brothers.// One day/ he and his little sister/ were playing near Mr. White's house,/ when he saw some men stealing Mr. White's flowers.// Teddy *must* tell Mr. White,/ but is afraid he will get a *thrashing.*

Q. What will Teddy do?

5. Mr. Thomas is very angry with Jimmy/ and says that if Jimmy dares to come near him/ he will give him a good thrashing.// Jimmy had *no* brothers/ and *no* sisters.// One day/ he was playing with another little boy/ near Mr. Thomas' house, when he saw a man creeping in at the window.// Jimmy *must* tell Mr. Thomas/ but is afraid he will get a thrashing.

Q. What will Jimmy do?

6. Mr. Blake is very angry with Willie Jones/ and says that if Willie dares to come near him/ he will give him a good thrashing.// Willie had no brothers and no sisters.// One day/ he was playing *quite alone*/ near Mr. Blake's house/ when he saw a man climbing in at the window.// He *must* tell Mr. Blake/ but is afraid he will get a thrashing.

Q. What will Willie do?

7. Once there lived a man named Robin Hood. He had many enemies/ who would *kill* him/ as soon as they caught him/ or saw him.// One day he was going through a forest/ *alone*/ when he saw a little boy lying at the side of the road/

badly hurt.// Robin wanted to let his father know about it;// but knew/ that the soldiers/ would catch him/ if he went there.

Q. What will Robin do?

8. Jack Burns was a very clever hunter.// He had a little dog/ named "Spot"/ who was almost *as clever*/ as his master/ and the two were *always* together.// One night Jack was away from home/ hunting/ and far away from houses/ and people.// It was a *very cold* and dark night,/ and it was hard to see the road.// Suddenly Jack trod in a hole/ and broke his leg.// There he lay.// He had to get help,/ as otherwise/ he would die.

Q. What could Jack do?

The respondent who carries sand in his mental baggage over to the *rocky hill* in his effort to put out the fire (item 2 in test *A* above) is reacting on the level of "empirical concretes." His reaction may point to a low-level native capacity or it may be interpreted as having some connection with the methods of education. He was told in item 1 how to put out the fire. That is the way to put out the fire for all those who are victimized by spoon-feeding methods of teaching. A mind trained to expect ready-made answers will be tempted to put out all fires in the same way. Pupils taught to recite answers found in the book, trained to report what they are told, exposed to the highly organized results of routine methods, may be expected to look for their opinions and conclusions later in life in the standardized agencies of Press, Party, Institution. No hasty judgment should be formulated about a pupil's mentality if he fails to rise above the level of "empirical concretes." Not until some practicing ground is found for educing relations is it wise to classify the individual. It does not do to reduce such ideas to a concrete figure or label. And whenever the process is carried over to the business of sticking labels on persons, it becomes exceedingly difficult to reconstruct the individual. As soon as that is done people stop bothering to think for themselves. There is need in advance of any classification of some emancipating forms of education that will develop and test this capacity to see relations.

If the respondent in item 2 resorts to throwing rocks on the fire, acting under the suggestion of the idea of a rocky hill, he has advanced one step in the intellectual life. He has lifted himself to the level of associative reproduction. The person who thinks out "air-excluding" as a conceptualization in dealing with these items will hit upon such suitable responses as the Indians' blanket or other smothering-like materials with which to put out the fire.

In the second situation-test in item 2 the respondent is expected to send the little brother. But if he persists in item 3 in using a little brother, the lower levels of association by contiguities are controlling his responses. The evolving of the "messenger-idea" as an independent act of the individual is the finest evidence of high intelligence in this learning situation. After that achievement, each item may be approached with a sense of freedom and security.

It is not difficult to imagine what would happen if either of these situation-tests were given as a "lesson" in the conventional procedure. Let us suppose the second one to be so regarded. It is quite possible, in fact highly probable, that the teacher, laboring under a distorted conception of such an idea as the overview, would prepare the minds of the pupils for the lesson-learning performance by *telling* them that the idea of messenger or of sending a message appeared in each of the eight items, and further, that they write certain dictated ways of sending messages, as, using the telephone, shooting an arrow with a note tied to it, calling on a neighbor to tell some one, using a dog, and so on.

In brief, the schools are so obsessed with the practices of getting information, of learning what the book says, of covering the ground, of cramming the facts, of reciting the lessons and of testing the products that the true aim of education is missed. It is in the *process of educing* these relations that true and vital education consists. Even when teachers catch the gleam and seek to institute procedures calculated to cultivate the self-active, responsible, independent individual, the difficulties are almost insuperable. A suitable answer spreads like an epidemic. The minds of our students are corrupted to the roots. Teachers are not habituated in the arts of *watching* and *respecting* individuality. The disposition is to tell what we know. It appears to be the line of least resistance to furnish the minds of our students with ready-made solutions. Teachers are tempted by the system to become peddlers of second-hand knowledge. The point is clear. It is the self-active pupil who is to educe for himself the "messenger-idea" as his own conceptualization and it is the pupil himself who is to be stimulated to discover suitable responses in each item of the "lesson."

Try it. Take two sets of maps—one set of rainfall maps, one set of maps showing timber (lumbering) areas and use them in any grades of the junior or senior high school to discover to what extent boys and girls may be able to educe for themselves relations between the two maps. An appalling thing happens. Unless they are told what the relations are, or unless they can find the relations in the books, they will for the most part chatter nonsense, not because "human nature is what it is," but rather because they have not been educated to do such things through inquiring and creative types of activity.

The folkway mind, whether in the bush or in the market place, is equipped with an assortment of patterns. The new situation is confronted, not with any fresh impulse of initiative and originality, but with a ready-made formula stamped in the mind by custom. The unintelligent mind has two filing compartments, one labelled "right" the other "wrong." That mind succeeds in placing all situations, the solution of its problems, in one or the other of these pigeon holes. The intelligent person has a series of filing centers running out toward each of the two carried by the unintelligent mind, but the intelligent individual seldom, if ever, finds anything to put in either extreme of the series. He simply cannot be an absolutist in a world of relativity. One may allege that there can be no doubt that two plus three equals five. *The point is to remember what sorts of things and ideas and scores are being reduced to arithmetical ratios and number scales.* The mathematician is not confused about it. He knows that the grist brought to his mill is made up by human hands (human judgments).

A noted inventive engineer, associated with the General Motors and the Standard Oil Company, declares that in taking on college-trained engineers he has to *deeducate* and *decivilize* them. His observation is that they lack imagination. If given some new applications involving large sums of money and asked (Agassiz-like) to go off and study one of them and come back and tell him what the solution ought to be, these college-trained engineers, he says, will very frequently report that they cannot tell what to do because they are unable to find the *answer in the books.* Now this engineer has no quarrel with mathematics, physics, and chemistry, and other techniques. Those things must be had at all costs. But if the student emerges with nothing beyond a "bombardment of routine," if he has mastered his techniques and for any reason comes out of college with the sources of life sapped; or to use the engineer's expression, if the student comes out of college without imagination, he is in a poor way of becoming an engineer. He is, in fact, in possession of the *mores* only and may not rise appreciably (relatively speaking) above the folkway mind. Elaborate and even scientific techniques are hardly the differentia of primitive and civilized man. The quality of imagination cultivated and the opportunity for the expression of initiative are indispensable factors in the new education.

The reader will be impressed with the important fact in these *situation-tests* that the two basic pillars of *scientific method* are observed: (1) the law of repetition, (2) the law of isolation. (Both are so often conspicuous for their absence in the general run of tests of all sorts.) Be it remembered that the law of repetition does not consist in administering some test to a million school children. It is not so easy to see as that. In both situation-tests certain "fundaments" appear in each item of each test. In this fact we have discovered in previous chapters the tactical principle of organizing units of learning within the Contract Plan. The law of isolation is clearly suggested in the "*air-excluding*" and "*messenger*" ideas which are to be educed by the testee (and learner) upon the basis of which or in terms of which other suitable eductions are created. This fundamental principle also forms a basic guide line in the construction of contracts—a principle we have used frequently in preceding chapters. We have anticipated in chapter I the discussion which has been so illuminatingly promoted by these situation-tests of Dr. Strasheim. The vital suggestion is the challenge to teach by situations instead of subject-matter, meaning by that a progressive reorganization of subject-matter illustrative of phases and levels of learning areas designed to stimulate the study of problems by the use of subject-matter in a developing, purposeful, creative adventure.

An excellent example of organizing materials of education for the purpose of assisting pupils in the processes of *educing relations* is found in the primary work of the grades where notable advances are being made in productive types of creative procedure. The pictures and sentences (p. 162) represent the finished product of the pupil's work. These pictures and sentences are pasted on separate cards. The problem is to arrange them so that an appropriate sentence will appear with a given picture. Any number of each set may be furnished. With some three or four dozen of each, the pupil begins the search for *suitable relatings*. It may require the reading of all the sentences before the "suitable" response (sentence) is hit upon. The pupil does the work. A purposeful activity is initiated. There are four fundamental desires, common to all human beings, appearing in this little exercise. They are (1) the *hunting pattern* (searching and researching), (2) *discovery* (mastery), (3) *recognition* (*i. e.*, the pupil's activity is rewarded in certain satisfactions social in their nature), (4) a sense of *security*, all of which we have discussed in another connection. The illustration is suggestive.

A higher level is suggested in the procedure of setting out a picture with a number of sentences (pasted on separate slips of paper) which are to be so arranged as to make a connected story. Varia-

Jack and Jill

We went up the hill for water.

Indian Chief

I live in a big wigwam.

Humpty Dumpty

I had a great fall.

toad

I hop in the grass.

violet

You pick me in the spring.

tions may be introduced. Certain key sentences may be furnished the pupil, the challenge being to work out such relation eductions as will complete the sketch or story. Once started along this trail, the pupils themselves will begin to work out new applications of a principle without being told. The foundation of initiative will thus be laid. It is not our purpose to furnish charts in these illustrations. The emphasis is placed throughout on a compass. Two dilemmas are avoided in this thesis. (1) Mere "methods." The nurse in the hospital was constantly waking up her patients to give them their sleeping powders. (2) Excessive testing. Henry remarked to the doctor, "Please go on and treat me for typhoid. This diagnosis is killing me."

A higher level still is attained when the pupils take the picture and write their own story. A kind of step-up transformer occurs to one thinking it out along this line. There is no upper limit in fact. Creative genius of the highest quality may be envisaged as the goal. All along the act of *relating* is the act of *creating*.

The tactical principle for the new and the true education is suggested in these illustrations and runs all the way from the child's letter blocks to his Ph.D. degree.

In the upper years of the student's life we have scarcely entered the frontiers of the empire of the mind. The Junior High School has been the focus of educational discussion for a decade and a half. Something of a gleam of new horizons has been sensed. "To blow on the coal of civic honor until the whole nation becomes incandescent" has been a dream of educational statesmen. Study and research in this area have descried new vistas in both directions. "No man's land" of the intermediate grades (4th, 5th, and 6th) will soon be penetrated by scientific and creative workers. Beyond are the frontiers of the Junior College with its intriguing problems. A Junior High School of four years and a Junior College of four years with basi-terminal points and with a program of economy of time for capable students are forms of organization in the offing to be reckoned with.

Illuminating discussion should arise from the situation-tests. The validity and value of them and the thesis behind them might prove thought-provoking. Does capacity to educe higher and higher relations in such situations carry over or "transfer," or are eductions in any way facilitated on future occasions? Are all subjects of the curriculum capable of organization in terms of a progressively realizable series of situations which will require *relation eduction?* If not, "what subjects are of most worth" to ask Herbert Spencer's question again? Does the "transfer" depend on the "methods" and the "systems" employed? Are subjects which offer the largest variety and number of possible relations the most fruitful subjects in the curriculum?

It would seem to be reasonably clear that the capacity to establish or to *see* relations is the basis of creative education. If the curriculum presents in one isolated corner of specialization the *flower* and in another fenced-in course the *bee* (Botany and Zoology as viewed by specialists) the act of relating may not occur to the mind of the student lost in the highly specialized art of mumbling terminologies. The vitamin of generalization seems to be lacking in the pursuit of "courses." The student who educes the relation between *flower* and *bee* is engaging in the act of creating his own scholarship. The entire chapter on *Reasoning* in James' *Psychology* is readable and illuminating and should be rediscovered by all experts in mental testing. "For his original concrete the reasoner substitutes its abstract property *M*. . . . Reasoning means substitution of parts and their implications for wholes. . . . Mediately or immediately, that one thing is related to everything else; and to know *all* about it, all its relations need be known. . . . The geometer's genius lies in imagining of the new lines, and his sagacity in the perceiving of the relation."

No resting place has been found in these experiments. "What did Tom do?" Whatever he does, the answer is not final. Broadly speaking, we have to consider the *school-bench* situation on the one hand and a *real* situation on the other. The old ghost of "transfer" will not down. The testee may put out the fire in a perfectly satisfactory academic fashion sitting at the school bench, or even in an animated discussion quench without water the hypothetical flames of the hypothetical burning dress of a hypothetical little sister; and yet, in a real situation receive such a shock at the sight of a person caught in a consuming fire that he would rush frantically from futility to futility and fail utterly to display that "intelligence" so satisfactorily recorded in a totally different situation. And *per contra.* A near-railroad wreck (a real situation), train going 40 miles. Diner and parlor car jump the rails. The conductor in front of the respondent in this near-wreck was utterly confused and did not hit upon a single "suitable" act to cope with the situation. Joshua, the brakeman, without the slightest hesitation fairly leaped for the emergency cord, and the engineer with like response set the brakes and brought the train to a standstill within some eighty yards, thereby avoiding a shocking disaster. All three of these men had acquired railroading mindedness and the engineer was as intelligent as the conductor. In an academic test, the conductor and engineer would doubtless surpass Joshua in answering the question, "What would you do in an impending wreck?" It is quite probable that Joshua would have responded in terms of his old, primitive emotions in contemplating what he would have done. In the real situation his nervous system did not "forget" what to do, although it was not a case of acting on the basis of experience in railroad wrecks. Both Joshua and the engineer rose to *suitable* responses as if to the manner born. In that direction we are going to find a new *cultural* efficiency which may be appreciated and appraised quite irrespective of race, previous condition of servitude, or mere academic "*contact with*" the best the old régime has produced.

These observations are no adverse criticisms of mental testing. If they were, and were valid, practically the whole scheme of formal education would fall, or at least all instrumental (preparatory and disciplinary) education would vanish.

There are at least a dozen major factors to be taken into account in appraising any form of testing: —temperament, experience, a lucid interval, fertility of learning, attack of realization, knowledge, insight, the flash of illumination, creativeness, sagacity. The disposition to do what one *can* do and not merely what one *does* do; the ability to cope with new situations with one's wits collected and with composure and in full and functional possession of one's mental processes; all the factors in the Downey Will Temperament Profile Test,—these and many more items enter into the picture.

"What did Jack do?" Some very intelligent little child may never have seen a dog or heard any stories about dogs acting as messengers. Without dog-experience, real or literary, that intelligent child may educe a perfectly clear "conceptualization" of the *messenger-idea* and yet fail to give a suitable answer in this item of the situation. Fertility of learning is a factor that may, in certain situations, condition the application of high levels of association by similarity, whereas accidental knowledge in other situations may enable a mind disposed to dwell on the level of association by contiguities to surpass a near-genius in particular items of a test. Experience will always play an important rôle in testing programs. "What will Robin do?" The child who has knowledge of the Robin Hood story will have an advantage in that part of the test. All of these points are capable of indefinite elaboration.

It is doubtful if any kind of testing reaches the higher powers of the mind. Those powers may be syncopated out of some of the less complex qualities of the mind. That is, they may be highly attuned to new situations, enabling the man of insight to move at once into the center, the focus, of a problem and see a possible solution. The act of *relating* is conceived to be the act of *creating*. The higher levels may be regarded as an extension of a process manifesting itself in manifold ways in a progression from inconspicuous achievement common to all up to what is called genius in art, music, poetry, science, invention. No controlled experiment has been conducted, nor is any likely to be set up, that will enable us to select, in advance of the experiment of living and creating, those "gifted" persons (if they are gifted) who are destined to achieve high distinction. Such "genius" has its own mode of expression and probably cannot be captured or photographed.

The student of psychology recognizes the difficulty in attempting to formulate any valid and comprehensive definition of intelligence. The thesis of this book is that intelligence is a problem-solving organization of the "mind." The measure of its efficiency is the degree to which experiences are confluent.

We have discussed at length certain conditions of reaction. The suitability of response is the basis upon which "levels" of intelligence may be tentatively postulated. The psychologists and the philosophers will have to be summoned at this juncture. We are interested in blazing a trail in the direction of creative adventuring. The deepest issues of science and philosophy are involved. The old conflict over absolutism and evolutionism appears. Stating the conflict in another mode, one may say that it is the special creation theory versus creativeness; unless, of course, in this focus of the problem the contention should be that each individual is a unique thrust and that a mould is smashed in every act of creation. The absolutists are having a hard time of it. The endless creation of a future intrigues interest and kindles imagination.

Any presupposition to the effect that education is primarily a selective process raises a far-reaching challenge. Is this problem-solving organization of the mind a fixed, inheritable, absolute datum? And if so, is it the function of education to discover it and to set up artificial screens at our college entrance gates through which only the finer grades may be sifted? Classificationists are in deep water these days, if we understand their programs. We shall try to find a way of discovering the individual in the next chapter. Status, it will be seen, robs us of our critical faculty. No experience, according to the Gestalt School of psychology, is ever identical with another experience, because the conditioning factors are infinite and always changing. No effort is being made in this book to establish equality in the common acceptance of that term. That different "levels" of intelligence are in evidence in any kind of testing cannot be gainsaid. There can be no doubt that endless differentiation is an abiding fact. Whether an individual may improve his own problem-solving organization may not be a proposition capable of objective verification. The denial of it certainly has not been proved, although the absolutists seem to argue that the issue is closed.

We have been projecting the guide-line hypothesis. The central question emerges: Is it possible through teaching and coaching to assist the individual in developing power to configure solutions of problems? Is this capacity to configure solutions of problems a native capacity? And is this capacity or ability a stubborn, fixed, unalterable factor or group of factors unmodifiable by education? If the intelligent man "knows" that the solution of his problem lies along a certain line, does the method of his training have anything to do with the degree of his success? We know that the intelligent mind works by adaptation of experiences and knowledge and not by a mere reproduction. To envisage a problem (all the way from solving cross-word puzzles and playing chess to solving problems in integral calculus and building new bridges) *is to select* what shall come to the mind. Just to have capacity for persistence and to proceed by trial and error until some approved answer is discovered will hardly satisfy the definition of intelligence.

The business of trying one idea after another with little or no inkling of their suitability is a mark of unintelligent procedure even though the diligent student may win the prize in accretive types of education. A glimpse again at the guide lines in Chapter I will reinforce the suggestion we are making bold to set forth. It is the proposition that some guiding principles, some ways of thinking, some gripping theme or hypothesis, some general frame of reference can be so presented to the creative learner and so gripped by him that he may go forward in a problem-solving situation with some assurance that his responses will be configured, will be shaped and directed, within the control of these guide-line principles. How do we know? Frankly we do not know. If the reader will use the key lines set forth in Chapter I and try the experiment of creating some patterns of his own, the direction of the argument will be sensed. Every comprehensive unit of learning by the *Contract Plan* will be developed within the control of some clarifying guide lines which will enable the student to direct his own efforts along lines which for him are both compass and goal, in a sense. All sorts of problems are suggested. There must be the urge. And there will be differences in the fecundity of ideas —differences as to individuals and differences for the same individual in different problems and in the "same" problem under different conditions. The only security in this changing panorama is to find a way of education by participation in creative significances.

In the conflict between two systems of life, caught up in any one of a number of awkward compromises, confusion is constantly arising over accidental factors in the picture. We all desire a release of initiative, the exercise of judgment, and a high sense of responsibility. And yet are we able to envisage and initiate a practical program in which these desirable qualities may be fostered? Democracy is always struggling toward its new freedom expressed in one form or another. Democracy is confronted with persistent entangling alliances with a social order designed to perpetuate authoritative and prescriptive methods. In the projection of the thesis of this book we are frankly recognizing the validity and the value of that body of growing opinion that sees in both the living school and the self-active individual something that is "self-adaptive, self-repairing, self-perfecting, self-regenerating, self-modifying, self-resourceful, self-experimental, self-creative."

CHAPTER IV

DISCOVERING THE INDIVIDUAL

In the great adventure of becoming an individual, in the challenge to worry enough to be an individual, in the daring suggestion to be disturbed enough to think with independence and to follow the argument where it leads, we find ourselves, at once, in a paradox of contradictions. It is first of all a rather difficult task to discover the individual, smothered as he has been in a tangled fabric of ideals and fundamental truths which have been sedulously guarded and conscientiously repeated on stated occasions, but have not been as carefully redefined and brought down to date as thoughtful men have felt they should be.

The essence of the Declaration of Independence is the doctrine that replaces classes by individuals. It was the first great official denunciation of the aristocratic order. It was written by a revolutionist of a visionary turn of mind, America's greatest political philosopher and thinker, and was originally designed, not to become a political platform, but a means of rallying the liberals of Europe and America to the cause of the colonists. That document remains the most succinct defense of the rights of the common man (the masses) and of popular government found anywhere in the annals of history. Out of this wonderful paper-writing a wealth of hope for humanity gathered about a mere political instrument. The Nation began unfolding in a moving panorama up from a group of rustic communities on the Atlantic seaboard, making common cause in behalf of ancient guarantees of English freedom, to a venerable Republic, the richest of nations, the champion and exemplar of World Democracy. The theory of the rights of man has been exhaustively and, at times, exhaustingly expounded. And yet that theory has not readily discovered itself in practice. Classes have not been replaced by individuals in the last analysis as a general practice. The habit of judging people by discrimination, rather than by classification, will need to be acquired before a full realization of the doctrine is achieved.

Every foe of aristocracy in governmental affairs has pondered the glowing periods in those immortal words: "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain inalienable Rights, that among these are Life, Liberty, and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed," etc.

Exactly what the founding fathers meant by these exalted sentiments, it is difficult to say. It is obvious, however, to the student of history and politics that a sharp antithesis in theory and practice has been carried along for some 150 odd years. The ideal of the free man in the "Land of the free and the home of the brave" has not been an idle dream. It has played a vital part in the life of the Nation, even though men have refused to live by it. There is nothing strange in the situation. It is not the first instance of a rift between a high ideal and the practice of that ideal. All sorts of dualisms might be cited. Much depends on the definition of the situation. A fine glow of enthusiasm may be generated in an academic atmosphere, and yet never illuminate a real problem in practical life. An old set of ideas may claim enthusiastic verbal assent, and yet be totally inadequate to meet the new situation. Democracy, itself, is a changing ideal. One of the greatest obstacles in the solution of any vital problem pertaining to human welfare is the reminiscent liberal repeating sedulously the old shibboleths, remembering conscientiously the truths of dead yesterdays. The individual will not be discovered by digging into the mass of idealism which suffused the State in the pageant as revealed in imagination and in fact.

Both Adams and Jefferson agreed that equality is moral and therefore a matter of justice to be socially secured. They never maintained equality of physical and psychological endowment. The "practice" of the ideals set forth in the Declaration affords a rare opportunity to the opponent of democracy. New England copied the customs of the "well-born." Seats at the table and in the meeting houses as well as places in the processions were all disposed of with a nice regard for social differentiation. Even in

Harvard College students were seated according to social rank and in a class of twenty-four John Adams occupied seat number 14. That fine old aristocrat, Governor Hutchinson, declared, "There were fifty gentlemen, actors in the Stamp Act riots, disguised with trousers and jackets on." Gouverneur Morris in 1774 gave his appraisal of the masses in no obscure terms: "The mob begins to think and reason. Poor reptiles! it is with them a vernal morning; they are struggling to cast off their winter's slough, they bask in the sunshine, and ere noon they will bite, depend upon it. The gentry begins to fear this." Alexander Hamilton denounced the masses as "turbulent and changing; they seldom judge or determine right." Mrs. Washington, finding a trace of dirt on her wall after a reception, exclaimed angrily, "No Federalist would do such a thing, only a filthy Democrat would mark a place on the wall with his good-for-nothing head in that manner." Harriet Martineau was told on her visit to America much about the "first people" of Boston, New York, and Philadelphia.

Sharp social cleavage was found between the ladies dwelling on Ash Street whose fathers had made their own fortunes and the social leaders of Chestnut Street who owed their wealth to their grandfathers. Out of the labor agitation in the twenties and thirties of the last century the demand arose for equal education at the expense of the government. The editor of the *National Gazette* about that time declared, "The peasant must labor during those hours of the day which his wealthy neighbor can give to abstract culture of the mind; otherwise the earth would not yield enough for the subsistence of all; the mechanic cannot abandon the operations of his trade, for general studies; if he should, most of the conveniences of life would be wanting; langour, decay, poverty, discontent, would soon be visible among all classes." It is no accident of the English language that we have our "coal barons," "steel kings," "railroad magnates," "cattle kings," "Napoleons of finance," "maids," "servants," "subordinates." Aristocracy has chameleon-hued qualities and readily adapts itself to changing situations. The aristocratic temper is mirrored in the manners and morals of people, in their religious organizations and beliefs, in provision for education, in economic systems and the like. (Some of these citations are adapted from *New Viewpoints in American History*, by Schlesinger.)

Higher education has been regarded as a prerogative of the wealthy few. The disposition is to have people content in that station in life to which it has pleased God to call them. Just when and by what logic the phrasing was changed from "*it shall please*" to "*it has pleased*" may not be revealed. At all events, aristocracy finds its own justification in many ways.

The extension of privilege may be regarded as the tactical principle of democracy in action. The right of suffrage makes luminous the point. A study of the development of the right of franchise from the date of the Declaration of Independence to the granting of this privilege to women would set forth the decline of aristocracy (apparent or real) in one direction. One hears and reads much about the failure of democracy. Would it not be a fruitful venture to trace the development of America with respect to some phase of the extension of privilege to detect the contradiction between a driving ideal and the practices of government and powerful groups?

The real issue lies in the fact that democracy has been superficially examined, found difficult, and left untried. A start may be made by acquiring a vocabulary of good words: coordinate, integrate, unify, interpenetrate, associate, harmonize, correlate, contribute, interrelate, interweave, compound, reciprocally relate, create, share, participate. A vital democracy will be realized only by carrying out the function of *verbs*. It cannot be done with *nouns*. Nouns as slogans carry too easily the vested interests of inertia. After getting a few democratic *verbs in action*, it is well to introduce some good phrases and nouns: partnership, corporate life, unity, sportsmanship, emerging unities, cooperation, organization, process, creativeness.

While it is true that the practice of democracy has been for the most part inextricably entangled with customs and conventions carried down from the old social orders, nevertheless the Soul of America is not a mere fiction. The boy in a New York school said the world was created in 1776. No youth ever spoke more wisely. The world he lived in was created in 1776. America has been called by its critics a "melting pot," a "varnishing pot," a sausage machine grinding out equality sausages. A truer insight is that of Stanton Coit who grew up in America, went to Germany for his higher education, and then to England, where he has spent his years in productive thinking. To him America meant the *absence of the State*. He was impressed by the genius of Germany for organization. There the State appeared above you, below you, to the right of you, to the left of you, in front of you, and behind you. Later with a thousand years of the Past pressing upon him, America came to mean the *absence of the Past*, the absence of historic sense, the absence of the pressure of tradition. (Coit would not have us forget the Magna Charta, the foundation of American political and personal liberty as well as that of English liberty.) Ideally the genius of America has meant freedom to venture into the uncharted, unguaranteed future. Americans believe in education and in science, but they do not depreciate insight and imagination. Science is for them only the hand-maid of mother-wit. They seek, when they think in terms of their ideals, to escape becoming victims of pedantry. Scientific management ought to be a positive means of ridding business of routine and the dead hand of tradition. It is not a superimposition of authority unless practice is squared to an unAmerican ideal.

Zimmerman in the *Sociological Review*, 1912, describes America as a people of action in these terms: (1) an inexhaustible fountain of kindness, (2) wonderful alertness and adaptability, (3) an undaunted self-confidence, (4) a ferocious optimism, (5) ingenious delight in novelty, replacing the philosophic "why" with the unanswerable "why not," (6) a nonchalant venturesomeness, (7) strength of purpose and vigorous tenacity, (8) absence of self-consciousness or reflectiveness, inclination by virtue of education towards using the mind as a quick-firing gun, (9) possessing all the qualities of childhood except reverence, easy emotions, rapid tempers, lively curiosity, sunny expansiveness, irresistible buoyancy, fickle memory, disobedience, tragic capacity for laughter, insatiable appetite for sweetness and light, instinctive loyalty, infectious vitality, comradeship. "Pioneers, oh pioneers!" who win by audacity.

With such outlook and adventuring it would appear that we had discovered the individual in the making. But when programs are made effective, a routine that seems imperative too often submerges the ideal. In feudal days the task masters assigned *the* tasks to their slaves and serfs and they stood over them to see that *the* tasks were done. The individual had no share in the making of those assigned and ordered tasks. He was regarded as a cog in the feudal machine. Modern business with the automatic machine has even intensified in a way a feudalistic régime for a large number of laborers. To what extent education by participation has been achieved will be suggested by such analogies.

Looking at our authentic Americanism from another angle, emphasis is laid on the real nature of our nationalism. In fact, it is inter-racial. A unity is envisaged in which there is a disposition to draw out the best in each element of our population and a synthesizing of these qualities and cultures into a common fund of wisdom and experience. As Dewey says of the spirit of America: "Neither Englandism nor New-Englandism, neither Puritan nor Cavalier, any more than Teuton or Slav, can do anything but furnish one note in a vast symphony." In that philosophy the hyphen no longer separates, but connects. In a "shared life" there will be displayed the spirit of "give-and-take," of "live-and-let-live."

Closely allied to this discussion is the notion of status. The Pharisee could devoutly thank his Jehovah that he was not as other men. The Stoic was proud to be a Stoic, a distinction held above that of being Emperor, or a Roman, or even an aristocrat. The Puritan too often boasted of his virtues. The classicist has sometimes placed an enormous emphasis on the quantity of the vowel. A false quantity was a mark of a socially inferior education. The dropping of the "h" by the English cockney is a mark of distinction. Shiller declared that it costs fifty thousand pounds to fabricate the English gentleman and he doubted the wisdom of paying the price. It seemed to him more than the traffic would bear. "Ornamental" education is tied and tangled in status in one form or another. The ascetic could deny himself the joys of living to gain some esoteric end. In brief, some form of the *mores*, some badge, some creed, or loyalty has been made the basis of recognition of people. It has been difficult to appreciate and appraise an individual who happened to fall outside the definition of one's own group. The old trappings may disappear with all the heraldry of titles and yet the essential modes of status may be perpetuated in sublimated forms.

Status has always robbed man of his critical faculty. How difficult it is to reconstruct an individual once labelled! Status cuts wide and deep and insinuates itself into democratic life in every conceivable manner. Any individual in a group who is intelligent enough to be ignorant of some passing, trivial episode is looked upon as being different, if not queer. Within our limited groups the disposition is to emphasize given similarities and to acquire pretty much the same standardized forms of information and opinion. It is obvious that any such exclusiveness or regimentation runs contrary to the genius of America, if ideals count in the life of a people.

Status lies at the root of the controversy over utilitarian and cultural (ornamental) education. All forms of discussion employing those pronouncements couched in the phrase "those who," hark back to the laboring "masses" and the privileged "classes." "There is a form of the debate between aristocrats and democrats, the former holding that the privileged class should be taught to employ its leisure in ways that are agreeable to itself, while the subordinate class should be taught to employ its labor in ways that are useful to others. The opposition of the democrats to this view tends to be somewhat confused: they dislike the teaching of what is useless to the aristocrat, and at the same time argue that the wage-earner's education should not be confined to what is useful. Thus we find a democratic opposition to the old-fashioned education in the public schools, combined with a democratic demand that working men should have opportunities for learning Latin." "The democrat does not wish to divide the community into two sections, one useful and one ornamental." * Now that conditions have changed with the eight-hour day and leisure may be had by the "laboring man," if he has time and money, it is obvious that the old terms "vocational" and "cultural" have lost their significance. The conditions of the old status have disappeared. Some emerging unity, such as cultural efficiency, is needed to express a new significance in education.

Those who boast of their exclusive traits will find a surprise in *Arrowsmith.* "Martin, himself, was a typical pure-bred Anglo-Saxon American, which means that he was a union of German, French, Scotch, Irish, perhaps a little Spanish, conceivably a little of the strains lumped together as Jewish, and a great deal of English which is itself a combination of primitive Briton, Celt, Phœnician, Roman, German, Dane, and Swede." Martin inherited his limitations; his virtues he acquired. His identity, racially speaking, is not exactly homogeneous. While he is difficult to classify, although a pure-bred Anglo-Saxon American (possibly a one-hundred percenter), he still has the chance to become an individual if he only chooses to be disturbed enough.

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* Russell, Bertrand. *Education and the Good Life*, p. 24.

H. G. Wells would make a clean sweep of it. "All the antiquated nonsense of calling people bachelors and masters and doctors of arts and science might very well go, with gowns and hoods that recall some medieval alchemist or inquisitor, to limbo. They mean nothing. There is no presumption that a man who has a diploma, or whatever they call it, of M.A., is even a moderately educated man. There are millions of people, half-educated and uneducated, vividly aware that they are ill-informed and undirected, passionately eager to learn and to acquire a sense of purpose and validity."

The business of branding people with degrees has come to be a form of protective coloration. School marks are the registrar's currency. By a process of accumulation of mechanical units certain legalized forms are satisfied upon the basis of which the titles are bestowed. There are notable exceptions to be sure. In the granting of honorary degrees a genuine effort is made to honor the true investigator, the creative scholar. The college must decide honestly and unflinchingly whether it wants to attract and then satisfy active minds and ardent spirits, assured that *truth is the intellectual activity of the spirit.*

The working men themselves in England are eager for courses in literature, art, history, psychology, sociology, political science—not one of which adds a whit directly to earning capacity, but which they think will open the windows of the mind. In that program of adult education they find they do not have to master all the intervening stages of grammar and high school curricula before taking up collegiate subjects. These working men are found sitting in the same seminars with regular graduates of Oxford, and the depth and originality of thought and keenness of insight which they display measure up to the reactions of the advanced college-trained students.

Status has blinded us to these possibilities. Only those who survive the bombardment of routine are thought to belong to the educated class. A peculiar climate of opinion is produced about the surviving remnant making the last hurdles in the educational relay. Two out of one hundred entering the first grade reach the doors of the college or university. They are thought to be a peculiarly gifted and selected group, until the college professor begins to assay their mental equipment. He, the professor, looks upon the saving remnant as a badly damaged lot, and complains bitterly about their preparation for college. What of the ninety-eight who have been deleted along the educational highway! Clearly impossible, it is maintained, to educate the masses!

Neither in the practice of a "democracy" with the ideals of a genuine form of associated life through participation deleted or smothered nor in the surviving and sublimated forms of status will it ever be possible to discover the individual and conduct a program of education by and for individuality.

Another approach to the problem may be made in a brief philosophical sketch.

Three positions have been maintained. "(1) Man *is* what he *was*. (2) Man *includes* what he *was*. (3) Man *is* what he may *become*." (Otto.) In the first proposition the recapitulation theory finds its warrant. The experience of the race is reproduced in the individual. It is perfectly logical to become a fatalist. If a child exhibits the characteristics of a savage, the explanation is forthcoming; or if traits of lower animals appear in human conduct, the lines of Sandburg are fitting: "I got a zoo, I got a menagerie, inside my ribs, under my bony head, under my red-valve heart." (There is more to his poem, the *Wilderness*, and a very different philosophy emerges in the total perspective.) In this view we are all monkeys when the masks are pulled off. There is nothing left, apparently, but "to stroke the backs of the chromosomes." Human nature is what it is. Human nature cannot be changed, "they say." With that persistent dogma in full possession of the minds of diplomats and office holders war is excused and a disastrous peace imposed. Human complacency for them and their disciples has never been scuttled with a picture of the new horizons. A world without hate and war is no more fantastic than a world without typhoid.

The mentality of the individual is fixed and unalterable according to the absolutists. Therefore label each one and let it go at that. By resorting to schemes of classification responsibility for changing conditions is no longer required. A false view of heredity flows out of the first proposition. A self-defeating theory arises.

"You include what you were" introduces a new set of factors. In the language of Robinson: "We are all animals and never can cease to be; we were all children at our most impressionable age and can never get over the effects of that; our human ancestors have lived in savagery during practically the whole existence of the race, say five hundred thousand or a million years, and the primitive human mind is ever with us; finally, we are all born into an elaborate civilization, the constant pressure of which we can by no means escape." * The last point in this reference laps over into the third proposition. Man comes to consciousness of himself as an individual because of his social environment. He is "social-copy" in that his "mind" is made up of beliefs, habits, and desires drawn from his social contacts.

Under the second proposition the doctrine of instincts plays a large part. Whole systems of psychology have been founded on the assumption that instincts are data (facts). Our pedagogical language (jargon) is burdened with alleged facts concerning the appearance of this and that instinct. The behavior of the child is explained by the emergence of these instinctive reactions, meaning of course that they are laid down in structure and as maturation processes are effected, specific instinctive patterns may be expected to appear. Thus the foundation is laid for the emphasis on similarities which often have no existence. What first appears to be native is in reality the result of social customs. Social attitudes are

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* Robinson, James Harvey. *The Mind in the Making*, p. 65.

data (facts), rather than instincts. If the latter were assumed to be hypothetical concepts, just hypotheses, the argument would be cleared for a recognition of individual differences in actual practices. The schoolrooms reflect a philosophy which has implicitly grown into organization—straight rows, identical desks, children of the same age doing the same thing at the same time in the same way, supposedly endowed with the same instincts and therefore to be treated all alike. The method of regimentation fails to release individual powers. A mistaken science of education has failed, and democracy should not be blamed until procedures, based upon the temperamental factors in the complex social attitudes, values, desires, and wishes, are evolved. Differences are more significant than similarities in the solution of problems of personality.

"Sectioning by ability" and establishing *A*, *B*, *C* levels of group mediocrities will never provide a technique for the discovery of individuality. The individual, the *genus homo*, is still thought to be just one of a large number of similar units. "Homogeneous ability" is a phrase to conjure with. Differences are again submerged by standardizing the things that ought not to be standardized.

Not only are instincts hypotheses, but the truths we live by are essentially hypotheses. Our most intimate and impregnable truths are recreated in action, in emotion, in life. The greatest thing on this planet is *realization* and never mere acknowledgement or remembrance. This realization cannot disclose itself in the devitalized and withered voice of the past. The creative spirit regenerates itself in constant new truth. The important thing to do in education is never to fill the "minds" with facts. True, the corpus of America was discovered *once* in 1492. The task of education is to see America (and democracy) as a living hypothesis. Actually, each child is to become an adventurer seeking for himself the new passages to Cathay. It is possible now to provide these pioneers with a compass that will enable them to turn on the power and to take the hazard with a new sense of security.

The book shall become, not a mere source of authority for complacent minds, but a point of departure. The word-bound, moribund pedant will be compelled to abandon his "spiritual monastery" (halls of learning) when creative and inquiring education is begun. Subject-storage methods in terms of "courses" are perpetuated on the theory that the full man includes what he was. In a "free" rendering the curriculum includes what it was. For the dead hand of the past rests heavily upon the high school curriculum. Tradition still largely determines its choice of subjects. Some changes have come and newer things have been slowly and cautiously introduced; others are in the offing; but many of them will be things of the past before they are admitted to this council-chamber of the departed. The school curriculum lags far behind the parade of modern progress. Traditional subjects and traditional methods of presentation persist. Fifteenth-century educational methods and practices are still being used in high places to achieve twentieth-century purposes and aims in the education of youth for living in a democracy. If we penetrate the true inwardness of our educational philosophy, we shall find whether works are to be preferred to words; whether we are really doing what we think we are and erecting our educational structure upon a firm foundation of creative *Learning*, *Life*, *Liberty*, and *Law*.

We have anticipated the third proposition in this little philosophical sketch, "You *are* what you may *become*." You are what you have capacity to become. You are the cooperative result of your "native" capacity and your environment, including now the new environment of ideas, emotions, and ideals. You are not merely all that you were but all that you *will* to become. "Man is not until he becomes." (Kant.) He began to be what he was to become or what he was about to become. Talent is capacity and capacity is achievement. "Character is built in the stream of life." (Goethe.) The central idea, the underlying hypothesis of this book as well as *Directing Study* and *The Self-Directed School* (its predecessors), is conceived to be an application and an elucidation of the doctrine that every individual *is* what he may *become*. Only by constructing programs in accord with this central idea will it ever be possible to realize the dream of creative self-mastery and the building of a mind that faces forward in adventuring and creative methods of thinking with a clear head and a brave heart. In fact, this entire volume is geared to this third proposition.

Freedom is never a donation; it must be won continually. Education is not *bestowed;* it must be everlastingly *achieved.* A prima donna remarked that climbing one peak will never be a substitute for the efforts required in climbing another. After winning great distinction you have to begin all over again. No badge is ever a substitute for that ceaseless battle to win new laurels, new prizes, new goals. It is often more difficult to generate the enthusiasm required to lift ourselves into the next achievement than in the first. The verve and urge and imagination in the first adventure may be superseded by a drab sterility and a barren outlook when it comes to meeting the new challenge. Liberty can not be bestowed. Freedom is *earned* capacity and ceases to be when it ceases to be a *becoming.* Many of us have never consciously engaged in creative work. We have been too busy absorbing other people's conclusions. In the new adventure we are seeking some way of promoting and securing the *self-discovering*, the *self-realizing* individual who can be trusted with power.

We have been trying to discover the individual, thus far, in three directions. We have shown the difficulty of finding a *modus vivendi* in the confused state of affairs arising out of contradictions in ideals and practices in our common life. We have commented briefly on the persistence of status. In neither of these directions do we find it possible to initiate liberating forms of education. In the philosophical approach we found two propositions which fail to emancipate the individual and release energy in productive lines of self-realization. The third proposition suggests a possible program. The individual is a center of creative energy using nature and nurture as its media. Any living organism displays an unspecified reaching out of its energy toward its own continuance, exercise, and expansion. Or, as Dendy in his *Biological Foundations of Society* indicates: Every organism is really a kind of expression or incorporation of the stimulating effects of the environment in which its life is passed. The organism literally creates its own eye. The entire development of the organism is really nothing but a series of responses to stimuli that follow one another in sequence. Adolescents *become* what their surroundings dictate.

There is a fourth major aspect of this discussion. It is the method of statistics and its implications and applications. The confidence that has been created in standardized results of endless variety is amazing. Prototypes, averages, the generic child, and all manner of undifferentiated objects are set forth as targets to aim our curricula at, and before which to perform them more or less spasmodically and systematically. Not since Noah slipped moorings and made for Ararat have men been so confounded and bewildered with facts and possessed of so little capacity to think in terms of central ideas in the light of the facts.

A distinction should be made at the beginning of the argument. The doctrine of rigid bodies is a highly sophisticated one. The discovery that bodies are not rigid is due to measurement. It is perfectly clear that measurements depend upon the use of number scales which must be assumed to be rigid. The measurements of quantities are rather complicated and intricate. The mass of an electron is .00000000-0000000000000000000901 grammes. It requires forty light-years for the light from the star, Capella, to reach the earth, the distance being 216,000,000,000 miles. Light "travels" 186,000 miles per second. And it is 200 light-years to Betelguese. The effective radius in centimeters of the proton is the fraction whose numerator is 1 and denominator 10 to the 16th power. In measuring increments of temperature two arbitrarily fixed points are involved within which we have to say equal increases in volume are due to equal rises in temperature, and to add to the simplification of this idea absolute zero must be explained. Quantities are involved in these illustrations. *Intensities* and *potentialities* increase the complexities incredibly. The scientist waves a torch in the jungle of mystery. He has snatched the lash from nature. We have a marvelous technology. But what of craftsmanship?

The theory of probability is one of those central ideas to which we have alluded. It is exceedingly difficult to disentangle an idea from the mass of facts in which it is smothered. The important notion about the theory of probability is the notion of prediction. It is just as important to emphasize what we do not know and what we cannot predict as to dwell on what we think we know and what we can convert into scores and reduce to mathematical scales. Jennings introduces a little dizzy arithmetic in presenting the facts about the chromosomes. 24 particles arrange themselves in sets of 12. For each parent 4,096 arrangements or patterns (by twelves) are possible. The combinations in the production of a new individual mount to 500,000. *The meaning of the meaning* is that each one of us had a chance to become any one of 500,000 different individuals. No hypothetical business about it is to be imagined. Two parents in the production of a new individual, according to the theory of probability, carry the possibility of just that. Literally we have an inexhaustible variety of possibilities for any individual. Thus *science* teaches us, and the *teachings of science* should give us pause.

The table, I, on the opposite page, is included in order to arrest attention in dealing with number scales. If the theory of probability is difficult to understand, some confusion may be avoided if the bases of prediction are studied in the light of the data below. One important use of the coefficient of correlation is that of estimating the per cent of perfect prediction. The various coefficients of correlation listed in column 1 range from .00 to 1.00. The multiple regression formula will add to the simplification of the problem. From this table, it is seen that a coefficient of .40 yields 8 per cent of perfect prediction. Column 3 shows the per cent of determining factors being

TABLE I

COLUMN 1 COEFFICIENT OF CORRELATION	COLUMN 2 PER CENT OF PERFECT PREDICTION	COLUMN 3 PER CENT OF DETERMINING FACTORS MEASURED
1.00	100.0%	100.0%
.95	68.8%	75.3%
.90	56.4%	67.4%
.85	47.3%	61.7%
.80	40.0%	57.1%
.75	33.9%	53.1%
.70	28.6%	49.5%
.65	24.0%	46.1%
.60	20.0%	42.9%
.55	16.5%	39.7%
.50	13.4%	36.6%
.45	10.7%	33.5%
.40	8.3%	30.4%
.35	6.3%	27.2%
.30	4.6%	23.9%
.25	3.2%	20.5%
.20	2.0%	16.9%
.15	1.1%	13.2%
.10	0.5%	9.1%
.05	0.1%	4.8%
.00	0.0%	0.0%

Professor Hull, University of Wisconsin, has explained the essential nature and use of the multiple regression equation and its use in making forecasts of aptitudes for various kinds of success. In this connection he has developed the essential nature of the forecasting error, or as it is called, the "standard error of estimate." He has shown that the error in forecasting success of a given aptitude by means of a battery of tests is equal to the standard deviation of the criterion, if the tests are of no value whatever. Conversely, the standard error of forecasting a criterion by means of a battery of tests is zero if the tests are perfect. He has shown that the actual efficiency of any test or the value of tests is definitely measured by this error of estimate. He has also explained that the size of this error of estimate is a very definite function of the correlation coefficient. Finally, he has pointed out that the correlation coefficient taken at its face value is by no means a true indication of a measured for the various coefficients of correlation. If the measurements at the time of admission to college correlate .60 with subsequent academic success, the admissions agency is measuring about 42 per cent of the factors that determine academic grades after admission. These samplings will enable the reader *to make* sentences out of the data of the table. We are merely hinting at the real problem of the scientific study of education for which we would that understanding might be substituted for a widespread practice of mumbling terminologies. To date, the correlations obtainable lie well below .60 and for the most part below .40 and are likely to remain so in a battery of tests.

The thing that needs to be said is that where all the people can read very few of them are developing capacity to think; that most teachers (and everybody for that) are full of self-assertion towards individuals and are slavish towards public opinion and dogmas, scientific and otherwise, emotionalized by accident;

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percentage efficiency of a battery of tests, but that this true efficiency is really represented by the formula:

$$E = 1 - \sqrt{1 - r^2}$$

This means that with a battery of tests yielding a correlation of 50, which is considered fairly good, in reality it gives a forecasting efficiency of only 13%. A correlation of 40, which is frequently used, gives a forecasting efficiency of only 8%. It requires the very large and almost unheard-of correlation of .866 to yield an actual forecasting efficiency of 50%. It is also emphasized that inasmuch as we are now very far from having any batteries of tests yielding correlations this high with any genuine aptitudes, and probably always shall be, that the use of tests in making forecasts on any useful aptitudes, vocational, scholastic or otherwise, is doomed permanently to be in the region below 50% efficiency, probably below 40% efficiency, and possibly even below 30% efficiency, since it requires a correlation of 70 in order to give as much as 29% efficiency.

that every number sufficiently large (but not too large) is a magical number. As Woodruff in *Plato's American Republic* declares: "Americans have a superstitious reverence for what they call the facts and a contempt for ideas, often talking as if ideas were less real than facts, instead of more real. Lists of names and long technical words are accepted as facts. Facts are what they teach in their colleges, for they have heard that knowledge is power and they desire power, and they think that knowledge consists of information. They are sure that when they have information they will instinctively act wisely and well. . . . The Americans find statistics a drug more powerful than alcohol, the women shamelessly revealing their craving and attending lectures, and crying out for facts, but meaning these numbers. For all large numbers and all numbers arranged in patterns have a magical power over them. And they will eagerly deny their own personal experience if it seems to upset what statistics say. And they have no notion that these numbers must be used with care, but will let themselves be led into any error by any cunning piper luring them to destruction, provided only that he can pipe the proper magic ciphers and talk to them in percentages. For these statisticians have more power to make great crowds follow them than Orpheus had." Lord Canning says, "Next to statistics, the most unreliable thing in the world is facts."

Is our technology to be destroyed on that account? Or, is it possible to use our marvelous technology in the promotion of craftsmanship and creativeness? The answer depends upon what ideas are to be disarmed and demobilized as well as upon what ideas are to guide society in the achievement of the good life. A torch is useful, not because of the light it sends forth, but because of the object it illuminates. The critical habit of mind is enormously important. Accuracy is the morality of the intellect. A rough measure of fealty to truth is the extent to which we are accurate in our thoughts, words, and deeds. The labor of culture results in a spiritual tragedy, if a man is merely intellectually furnished with a roomful of awkward truths which he uses to bolster up standardized opinions and prejudices.

Beauty, goodness, and truth are essentially the only virtues we are safe in pursuing for their own sake. A Clutton-Brock in his *Ultimate Belief* points out the dangers in all other pursuits. A mere æsthete becomes a hedonist; a mere intellectualist becomes a sophist and a pedant; if we eat for the sake of eating, we eat too much; if honesty is the best policy, policy will inevitably supersede honesty; giving charity and rejoicing in one's generosity is a subtle form of Philistine status; be good and you will find your reward shifts man's attention to goodness as a means; *truth will not be discovered in a society that asks what it is good for;* no one is to study for another reason; no one is to do right for another reason; to finish a student in docility and obedience in the dogma of belief is to leave him confused rather than illuminated by education.

Investigations show that the great majority of students who fall in the lowest 10 per cent (or some other division of the register) are poor risks for the next administrative unit of our educational establishments. Students in this group at Brown University, it has been shown, have only *two chances out of five* of remaining more than one year in college and only one chance in five of graduating. Many similar investigations yield comparable results. Now, the issue is clear: Is this a practical guide for the teacher or advisor *at the start*, at the threshold of particular individuals looking forward? Obviously, two chances out of five can never enable us to select *in advance of the journey* those two students in a group of five who are likely to succeed. Only Omniscience could do that. On the basis of this type of analysis the principal of a school is confronted with a definite problem. Five graduates stand before him. They all desire to go on to college. They have fallen in school marks or in the psychological test in the lowest 10 per cent. It is absurd to suppose the two who might survive the freshman hurdle could be chosen or that the one of the five who would reach the graduating class in college could be tagged at the beginning of the enterprise. It would be the last word in naïveté to conclude that each one of the five aspiring sons and daughters had two-fifths of a chance to make the first hurdle and one-fifth of a chance to make the second. No finalities are being indulged in this analysis. It is well to bear in mind, however, what the results might be when the professor changes his procedure.

A few suggestive studies are submitted at this juncture for the purpose of challenging accepted and convenient opinions concerning prediction. These studies are presented in the light of the technique so universally employed by classificationists. The question is: What do the facts disclose? When is a student a good risk? What security have we in forecasting what any particular individual will do? Large numbers with all the intricate involutions of statistical method should not blind us to the issues raised in the study of the individual, one at a time, confronting us with his problems, future, and potentialities. The "norms" used by insurance companies do enable the manipulators of the business to discover who is a good risk and who is not. But a man pronounced a good risk has no guarantee on his own future. Virtually, he enters into a contract that he will die before expectation in one type of insurance. That is the only way he can win. A bad risk need not despair. Remedial measures may restore him to health and usefulness. The point is that any statistical analysis has just so much validity and value in things intellectual and moral as can be applied to the individual.

Table II presents a unique and interesting study of the relative positions into which students fall in two correlated situations. We are indebted to Mr. Hughes for the following table—a part of a very illuminating study of intelligence scores and school success.*

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* Hughes, William Hardin. "Why Intelligence Scores Are not More Highly Predictive of School Success." *Educational Administration and Supervision*, 12 : 44–8, January, 1926.

TABLE II

a 35 Pasadena Cal. H.S. graduates as University of Cal. Freshmen

Army Alpha Scores	Students	Students	Achievement Ratios
180	1	13	1.36
179	2	25	1.32
161	3	19	1.31
161	4	5	1.30
160	5	3	1.22
158	6	1	1.20
158	7	6	1.20
158	8	7	1.18
157	9	8	1.17
155	10	10	1.17
155	11	14	1.14
150	12	4	1.12
148	13	33	1.10
148	14	26	1.08
148	15	30	1.08
147	16	24	1.07
144	17	31	1.04
140	18	16	1.03
139	19	9	1.02
135	20	11	1.01
134	21	18	.97
134	22	20	.97
132	23	34	.96
124	24	21	.93
124	25	27	.90
123	26	28	.90
122	27	2	.84
121	28	32	.84
120	29	15	.83
118	30	29	.83
110	31	23	.78
108	32	12	.75
104	33	35	.67
103	34	22	.47
101	35	17	.29

(Corr. .28)

b Pasadena Cal. H.S. graduates as Stan. University Freshmen

Thorndike Scores	Students	Students	Achievement Ratios
93.2	1	1	2.00
91.8	2	3	1.65
89.5	3	9	1.56
83.4	4	2	1.18
82.5	5	5	1.10
68.1	6	7	1.06
61.5	7	4	.97
58.7	8	6	.96
57.2	9	8	.75

(Corr. .24)

c 13 Pasadena Cal. H.S. gradnates as University of S. Cal. Freshmen

Thorndike Scores	Students	Students	Achievement Ratios
99.4	1	1	1.80
83.	2	13	1.51
81.	3	6	1.49
76.5	4	4	1.42
76.3	5	7	1.20
64.7	6	5	1.07
64.2	7	11	1.07
61.2	8	12	1.07
59.6	9	2	1.00
57.3	10	9	.90
56.8	11	3	.78
54.4	12	8	.29
33.2	13	10	.07

(Corr. .21)

Column 1 in *A* comprises the Army Alpha Scores listed in descending order for 35 students. Column 2 presents the achievement ratios of the same students listed by numbers indicating the relative positions taken in Freshman class, University of California. For example, student number 2 stood next to the highest, 179 in the Alpha Scores, and dropped to position 25 within his group. Number 13 rose to first place. If the two students numbers 12 and 13 with the scores of 150 and 148 had been considered by the faculty (or any one desiring to indulge in prophecy) as to their probable success in the first year of college, nobody could have conceivably placed them. Number 13 rose to first place, whereas number 12 dropped to 32nd place. In other words, they stood side by side in the first situation and then separated themselves by 31 points in the second situation, taking positions at the extremes of the register. All three parts of the table are illuminating and provocative. The range in *C* from 99.4 to 33.2 in the Thorndike scores will arrest attention. Number 13 with the lowest score rose to second position within his group. Every student in the entire list may be studied in the light of the facts disclosed in the charts. A notion prevails that students falling in the lowest register should not be permitted to enter a higher institution of learning, or at least should be warned with a discouraging persuasiveness. The fact that the coefficients of correlation run from .28 to .21 should be noted. Only approximately 3½ per cent of perfect prediction is produced and approximately 20 per cent of the determining factors are measured (see p. 196). It is well to remember that a low score in one set of circumstances is by no means a sure index of what will happen in a new situation. Mass scores, treated statistically, have been thought to yield a high degree of validity in forecasting what a particular individual will do.

This table, studied penetratingly, may dispel some of the pessimism entertained about the 80 per cent of "submerged intelligence." With a little social imagination of the sort that sensed far-flung horizons in the discussion of the Fisher educational bill in England and that gathers about the Nursery schools, it might be reasonable to believe that millions could be redeemed and that, instead of leaving children condemned to disease and misery and unawakened intelligence, some liberating forms of education may be realized if less is spent on self-aggrandizements by governments and individuals and more on making poor schools adequate, good schools better, and the better schools still more challenging. A *differentiated equality* of opportunity, not a standardized uniformity, stimulates general improvement by the examples of superlatively good schools.

Tables III and IV present a part of one of the most exhaustive studies available of pupil adjustment. We are indebted to the author of a brilliant book, entitled *Pupil Adjustment* * for the materials in these composite pictures. These five pupils were studied with the utmost scientific acumen during their high school life. The purpose of including table III is to direct attention to a further analysis of the gross scores to determine, if possible, some basis of explanation for the phenomena which appear in "good and bad risks" in the case of predicting what students ought to do, or may do, in the subsequent stages of their schooling. Table III is a presentation of the *Terman Group Test of Mental Ability.* The reader will note the ten items of the test, the time, possible score, scores made, and the IQ of each of the five students.

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* Reavis, W. C. *Pupil Adjustment*. D. C. Heath and Company.

TABLE III

TERMAN GROUP TEST OF MENTAL ABILITY

TEST	TIME MIN.	POS. SCORE	A 15–10	B 17–2	E 13–11	F 13–11	H 15–8
1. Information	2	20	20	17	15	10	18
2. Best answer	2	22	22	22	12	16	22
3. Word meaning	2	30	26	28	7	9	19
4. Logical selection	3	20	13	11	8	7	14
5. Arithmetic problems	4	24	22	12	12	10	6
6. Sentence meaning	2	24	21	14	11	3	12
7. Analogies	2	20	13	18	8	6	7
8. Mixed sentences	3	18	12	16	8	7	5
9. Classification	3	18	16	16	15	14	14
10. Number series	4	24	20	16	18	18	12
		220	185	170	114	100	129

A's IQ., 116;
B's IQ., 110;
H's IQ., 111;
E's IQ., 106;
F's IQ., 101 (E and F are twins).

An impressive fact is the range of differences in scores in the specific items of the test. For example, A with an IQ of 116 makes a score of 22 in item 5, while H with an IQ of 111 makes a score of 6 in the same item—a difference of 5 points in IQ and 14 points in item 5 with a shift of base from 116 to 22. E and F are twins with IQ's of 106 and 101. In item

6 their scores are 11 and 3 respectively. A study of the chart in the manner suggested may be continued *ad libitim.*

If a student with a low IQ pays dividends on the investment of education, to borrow the terms of the factory, a scrutiny of the items and scores in table III may arouse curiosity. If items 3 (word meaning), 6 (sentence meaning), and 8 (mixed sentences) are conceived to be diagnostic of linguistic power, it is fruitful to compare total scores in these three items and set them over against the gross scores. B and H differ one point in IQ and 22 points in sum of scores in these three items.

A's IQ—116; 3 items—59
B's IQ—110; 3 items—58
H's IQ—111; 3 items—36
E's IQ—106; 3 items—26
F's IQ—101; 3 items—19

If items 5 and 10 are indicative of the student's potential capacity in arithmetic, the results are likewise illuminating.

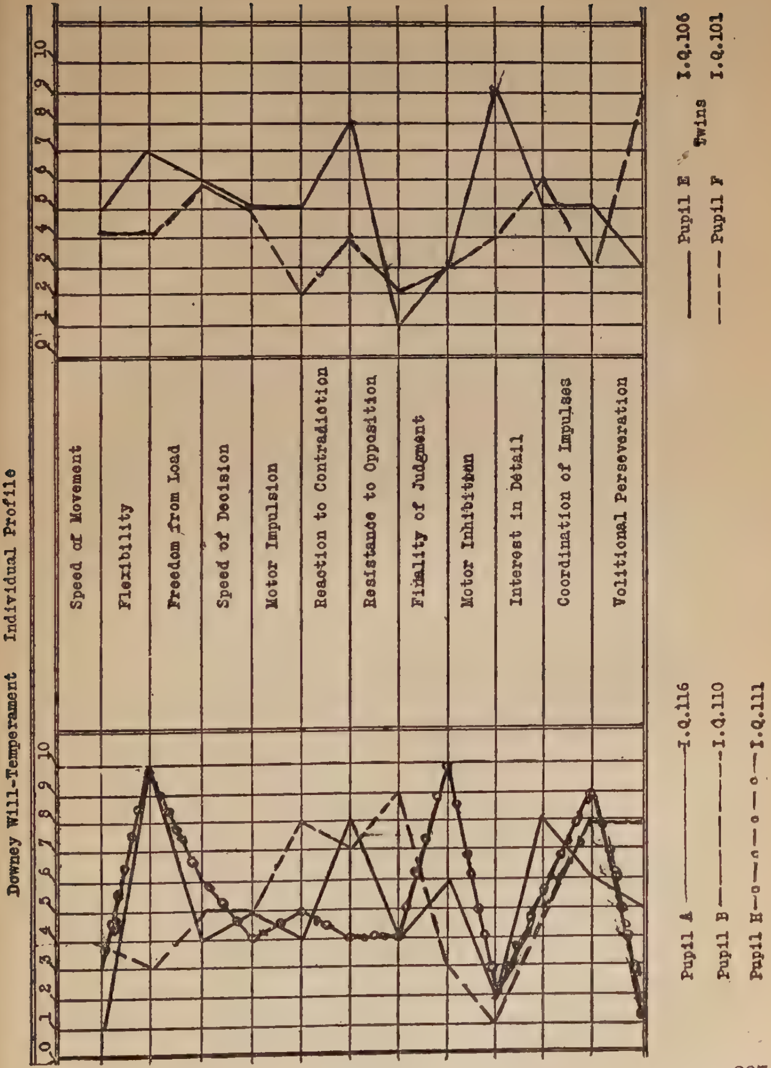
A—116; 2 items—42
B—110; 2 items—28
H—111; 2 items—18
E—106; 2 items—30
F—101; 2 items—28

Comment is unnecessary. B and H differ one point in the IQ and 10 points in items 5 and 10 combined. Again, a great many sentences more or less illuminating can be made out of the data of this table. H and F could hardly be classified by their intelligence scores if arithmetic is to be pursued.

Table IV presents the same five pupils in the Reavis *Pupil Adjustment* study, the picture being a composite in terms of the *Downey Individual Will Temperament Profile.* Twelve traits are arrayed. The scale, 0 to 10, is graduated from low, 0, to high, 10. Pupil A is represented by a solid line ————; B by a broken line - - - - -; H by a broken line and ciphers -o-o-o-o-o-o-. The twins, E and F, are charted to the right.

The spread in the profile is significant. In the second item, Freedom from Load, A and H are at the top, with B standing down at point 3 in the graph. All sorts of comparisons may be made. The twins present an interesting pattern. All we desire to do is to reinforce the admirable study Reavis has initiated. The study makes emphatic the significance of differences. The individual is still being discovered without a doubt. The gross score opens up a whole nest of problems. From tables III and IV, and similar penetrating studies, the achievements of students may be explained in part. The significance of a high or a low IQ may not be known in dealing with specific studies and outcomes until the scores in the items bearing on the specific studies are analyzed, and then compared with the positions the individual takes in the *Will-Temperament-Profile.* In other words, a scientific study of the individual opens new problems and questions at every stage of investigation. A definition at any point is bound to exclude far more than it includes.

TABLE IV


Downey Will-Temperament Individual Profile
0 1 2 3 4 5 6 7 8 9 10
Speed of Movement
Flexibility
Freedom from Load
Speed of Decision
Motor Impulsion
Reaction to Contradiction
Resistance to Opposition
Finality of Judgment
Motor Inhibition
Interest in Detail
Coordination of Impulses
Volitional Perseveration
Pupil A ———— I.Q.116
Pupil B — — — — I.Q.110
Pupil H —o—o—o—o— I.Q.111
Pupil E ———— I.Q.106
Pupil F — — — — I.Q.101
Twins

If two children have the same IQ, that fact is in itself of practically no significance to parent, teacher, and administrator of schools. There are literally hundreds of ways in which they differ—emotional tone, social stability, cultural background, friends, money, inclination, and the like. Individuality should not be reduced to identity. "In comparing tests and retests of two series we find that intelligence quotients of the children in the nursery school are going up at a spectacular rate as compared with the children on the waiting list." * The arresting fact in such evidence would seem to indicate that the mode and the manner in which the transmission of the evolutionary products of civilization is made constitute a determining factor in "intelligence."

Professor W. S. Miller, University of Minnesota, offers an illuminating suggestion in *Proceedings Second Annual Conference*, 1924, *Minnesota Society for the Study of Education.* In substance, he says an intelligence test does not tell how a pupil will react to a scolding, how he will apply himself, how he reacts to entertainment, how he will cooperate, etc. In speaking of 100 twelve-year-old children, with an IQ of 150, he points out a score of ways in which they differ. With *identical intelligence test scores*, some of these 100 children would be very courteous, some very discourteous; some would make excellent scholarship records, some poor; some would be industrious, some lazy; some would display high moral ideals, some low; some would be interested in music, some in art, some in business, some in radio, some in aviation; some would be indifferent; some would be sweet-tempered, some ill-tempered; some loquacious, some taciturn; some docile, some aggressively rebellious; some timorous, some bold; some under weight, some over; some tall, some short; some proud and haughty, some timid and humble; some given to routine; some disliking chores; some graceful, some awkward; etc.

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* *Concerning Parents*, p. 55. New Republic, Inc.

Furthermore, normal environment for man does not exist. There is no definite limit to variations. Even among civilized nations the degree of variations is great on account of the way tradition operates. By tradition here is meant the sum total of all such factors as language, customs, habits, attitudes, art, recreation, science. The influence upon the development of mental and physical characteristics, of disease, reading, drinking, smoking, nutrition, dress, climate, homelife is almost infinitely varied. Of four men, one may work inside at clerical work with no exercise; one in the cotton mill in the midst of moist air; one at physical labor in the mine in semi-darkness; one on board ship exposed to the rigours of the Atlantic. Among the same four some are meat eaters, some are vegetarians; some smoke, some are smoked; some are drinkers, some are abstainers. It is impossible to classify differences with so many cross currents in the picture. *Integration* replaces *segregation* as a principle of procedure. The foundations are being laid for integrating units of work and emerging unities which are to become the basic ideas in the *Contract Plan*.

We have been hinting the possibility of a practicing-ground for the cultivation of initiative and a self-discovering process in a "free"—controlled environment. The following experiment is a suggestion. The six-year secondary school in its various forms is involved. Without directly specifying what the Junior High School curriculum may be, it will be understood that guidance is offered within six centralizing cores. Any pupil, beginning with the seventh grade, may, if the plan is adopted, go forward with a sense of design in his studies. He will be encouraged to make intelligent choices and to organize his curriculum by observing two continuing principles which should be observed in curriculum thinking and building—the principle of *distribution* and the principle of *concentration*. The whole of the plan should be studied before making decisions.

ENTRANCE REQUIREMENTS TO THE UNIVERSITY OF DAHOMEY

The faculty of the University of Dahomey, desiring to discontinue their Ruth-Naomi relation toward the secondary schools of the province, voted the following recommendation. It has been printed in full on a large poster card and the visitor to any secondary school will find it on the bulletin-board where pupils and teachers, parents and patrons consult it for substance of doctrine and wholesome educational guidance.

1. Beginning September, 1929, the University of Dahomey will accept students from accredited schools on the basis of *twelve units* earned in the 10th, 11th, and 12th grades.

2. At least *three units* of the twelve must be earned in studies properly geared to the 11th grade, and at least *three units* properly geared to the 12th grade.

3. As a principle of guidance, it is recommended that the student in the 10th grade should plan a *tentative* distribution of twelve units in six emerging unities as follows (with due regard for the provisos in *a*, *b*, and *c* below):

2 units in *English*
2 units in *Science*
2 units in *History* (Social Studies Group)
2 units in *Mathematics*
2 units in *Language* (other than English)
2 units in *Constructive Arts*

(*a*) If the student has earned three units in the 7th, 8th, and 9th grades in any one of the six major fields listed above, *one unit* earned in the 10th, 11th, or 12th grades in that field will satisfy entrance requirements in that field.

A unit earned in the 9th grade in the 8–4 plan yields a similar result.

Ordinarily the student will enter the 10th grade with three or four fields approached in this manner, thus clearing the ground for a recognition of the *principle of concentration.* It is recommended that the student major in at least two of the six fields to the extent of *three units* in each of the two selected fields during his sojourn in the 10th, 11th, and 12th grades. Previous work, as indicated, has released three to four units for such concentration.

(*b*) Equipment, facilities, and teaching in each of the six major fields of secondary education must be approved by proper accrediting agencies. A major field (subject group) or courses within a major field may or may not be approved. A school may or may not be fully accredited.

(*c*) A student in the 10th, 11th, and 12th grades preparing for any particular higher institution or special school within the university will be guided in the choice of studies required to meet special entrance conditions.

EXPLANATORY NOTES

If agriculture is offered in the 10th, 11th, or 12th grades, it is suggested that science courses in agriculture be associated with the science field in 3 above. If agricultural economics is deemed a desirable course, it should be tied up with the Social Studies group.

A liberal application of this recommendation would permit stenography (properly accredited) to be offered in satisfaction (in part) of the *language* group.

A rigorous course in accounting might under certain conditions be allocated to mathematics. In general practice, however, the two units in mathematics will be algebra and geometry (conditioned usually as in (*a*) in 3 above).

A student whose English composition is defective will no doubt be guided in the 10th, 11th, and 12th grades in further choices of courses in English. Speech and debating and newspaper writing will find a friendly alliance in the English unity.

Constructive arts include music, art, metal and wood work, home economics, printing, mechanical drawing, and the like.

What a school can afford to do and what a school can do adequately will serve as guide lines in interpreting this recommendation to the school community. A laboratory science may not be undertaken if equipment cannot be provided. So with certain phases of the *constructive arts*. Attention will be directed to those fields that can be developed in the light of such data as the situation suggests. The recommendation carries the significance of a compass. A compass, wisely and intelligently used, enables the captain of the ship to use the engines to full capacity. Many designs and charts will be created in a liberal application of this recommendation to our growing secondary schools.

Accompanying this general recommendation, each major college will send to the schools a sort of *Cecil Rhodes* statement of the qualities to be cultivated in becoming an engineer, a physician, a lawyer, a journalist, a musician, etc. What characteristics and what preparation should a boy or girl consider in looking forward to a particular vocation? The effect of a brilliant formulation of the qualities of a great engineer upon the high school student would without doubt be far-reaching. Any clarifying statement worthy of the university will tax the genius of the professors. Suggestions as to courses to be pursued would have great weight. If majors were suggested, they would be elected. If imagination and personality and responsibility were deemed indispensable qualities of the engineer, the fact that respected and trained experts give advice would contribute to the moral tone of the school, and perhaps influence curriculum thinking and teaching procedure.

A PROGRAM

In a richly diversified, yet unified, curriculum content each adolescent during the yeasty years of 12 to 18 shall find solid self-active contact *for a time*

1. "With our racial inheritance as expressed in literature, history, customs, institutions;
2. With the scientific method of making phenomena intelligible;
3. With the mathematical way of looking at the world;
4. With the historical outlook upon man's development and achievement in building conceptions of a world of changes and developments;
5. With the method of expressing in other tongues what men have thought, felt, and done;
6. With the artistic categories for the expression and creation of meaning and significance in objective terms;
7. With the workaday performances of brain-guided hands."

Alexis F. Lange.

AN AIM—CULTURAL EFFICIENCY

"That man, I think has had a liberal education

1. Who has been so trained in youth that his body is the ready servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of;
2. Whose intellect is a clear, cold logic engine, with all its parts of equal strength and in smooth working order; ready like a steam engine, to be turned to any kind of work, and spin the gossamers as well as forge the anchors of the mind;
3. Whose mind is stored with a knowledge of the great and fundamental truths of nature and of the laws of her operations;
4. Who, no stunted ascetic, is full of life and fire, but whose passions are trained to come to heel by a vigorous will, the servant of a tender conscience;
5. Who has learned to love all beauty, whether of nature or of art, to hate all vileness, and to respect others as himself."

Thomas Huxley.

In re preliminary conference on entrance requirements to the University of Dahomey. What can the university do toward making the secondary school dirigible?

1. Desirability of *simplifying* by *centralizing* in curriculum reorganization.

2. Recognition of *differentiated* equality of opportunity. Acquiring capacity to judge by *discrimination* rather than by *classification.*

3. Emphasis upon a compass (a body of principles) by which a variety of charts (individualized patterns) may be designed by schools and by individual pupils.

4. Six common multiples, six cores of curriculum interests, six emerging unities, six guide lines, six major subject-fields. Suggested as a general frame of reference in which all courses of instruction may be integrated.

5. Intelligent attitude toward two underlying principles of curriculum thinking and building, (1) the principle of *distribution*, (2) the principle of *concentration.* Cognate subjects are somehow going to pull together in the mind, instead of hanging apart.

6. Recognition of need of standards, yet not to be hypnotized by statistical method. A unit of physics done in an elaborately equipped science department is not equivalent to a unit in physics done in a laboratory consisting solely of an air pump that refuses to work. Limitations of adding mechanical units recognized.

7. *Positive* university domination does not exist. (If it did exist the situation might be appreciably improved.)

8. *Negative* university domination does exist and expresses itself in ways that ought to be seriously challenged.

9. The leadership of the university has been surrendered. Educational politics has played an unenviable rôle. By futile compromise the university has euchred itself out of position.

10. Entrance requirements stand in an anomalous position due to one surrender after another. For a quarter of a century the University of Dahomey has been writing its own obituary and singing its swan song in different keys. The last lamentation arose over the demise of the foreign language requirement. The next dilemma the university is facing is

mathematics. If its traditional policy is pursued, mathematics will go with the foreign language.

11. A new challenge is presented. Let the university frankly abandon any authoritarian procedure. The day of prescriptive dictation is over. A new engine has been created in the American High School, and new development lies just around the corner. A junior high school of four years and a junior college of four years are even now going through the birth pangs. A six-year secondary school with its junior and senior divisions is only a part of the eight-year span, and the university will soon have to reckon with a comprehensive scheme of secondary education with its basi-terminal points set forth to meet the new conditions facing the commonwealth.

12. Positions of status are out of date. Any surviving forms of "higher" controls exercised by authority over "lower" divisions will inevitably result in just such muddling as now exists in the University of Dahomey with its Queen Anne front and its Mary Ann rear. The university has been compelled for political reasons to admit students carrying credits the faculty as a whole does not approve. As many as five of the sixteen (four of the fifteen) may be offered through the rear entrance in studies not acceptable. The faculty votes it and goes on reminding students, thus admitted, of the doubtful validity of their preparation. In passing, it may be remarked that the "social climbers" of the curriculum are making the Mary Ann rear more attractive than the Queen Anne front.

13. Dual curricula are no longer valid or possible or desirable for the secondary school. Curricula may not (should not) be used as a means of selecting pupils for one type of aim or another. Those of us who deal with the "squab" stage of adolescence appreciate the difficulties and sense the problems involved in guidance under free intelligence. The new four-year (11th to 14th grades) regional Junior College in the offing and the large senior high school may make beginnings in differentiated curricula.

14. Every course must be *vitally* basal and *vitally* culminal for every boy and girl while he or she is pursuing the course in question.

15. The plan submitted in the Dahomey "set-up" carries a recommendation to the secondary schools of the province. The operation of tradition is not disregarded. It is possible to have tradition operate with intelligence. The apprehension that the schools would go to pieces, if restrictive measures and embargoes were removed, is gratuitous.

16. A new responsibility will appear when teachers and administrators look to the university for guidance. Specialists ought to find the vitamin of generalization. The scheme as presented is intended to suggest a comprehensive study of the whole situation. The specialist is asked to see his specialization in relation to an integrated whole. The advice of a university faculty would be highly respected by school men under the plan proposed.

17. It is suggested that a critical study be made of the plan as a whole. It is further urged that hypothetical situations be set up and by using the plan try to figure out any patterns that would be unsatisfactory from the university point of view. Is it possible to fabricate a pattern that would be as bad as the best of those now presented through the Mary Ann rear?

18. In point of fact, the patterns made up out of these guide lines will, by and large, secure to the university a far greater number of "substantial" units for entrance than she can ever hope to have under a continuance of her present policy.

19. Any pupil desiring four years of Latin (three years in senior high school plus one year prior to it), may have it with no obstructions whatsoever. The same may be said for any other language, for mathematics, for science, etc. No student is going to come offering three of music, two or three of manual arts, and a mixture of "vocational" courses and the like. The principle of distribution takes care of that situation automatically. The plan operates as a deterrent to

small schools in the multiplication of "so-called" vocational courses.

20. Following are a few samplings made by high school pupils who studied the plan. They imagined themselves in the 10th grade. The patterns submitted will invite a careful analysis. These charts were made in the light of the conditions set forth in the plans. These charts are what they are—just charts. The unity of the patterns is not lost.

In the light of the data set forth in the entrance requirements for the new university in the plan submitted some students in the tenth and eleventh grades made their choices as illustrated in the following patterns. They observed the conditioning factors, recalling the studies pursued in previous years.

English	3	3	3	3	1	3	2	3	3	2	1	3	3	1	1	1	3	1	1
Science	1	2	1	1	2	2	1	2	2	3	3	2	2	2	3	3	2	2	2
History	2	2	2	1	3	3	3	1	3	2	2	3	3	3	2	2	1	3	2
Mathematics	1	1	1	2	1	2	1	2	1	1	1	1	1	1	3	1	1	1	1
Language	4	3	3	3	3	1	3	3	2	3	2	2	2	3	1	2	3	2	3
Cons. A.	1	1	2	2	2	1	2	1	1	1	3	1	1	2	2	3	2	3	3
English	1	3	3	1	1	3	3	2	3	3	3	3	3	2	3	1	2	3	3
Science	2	2	2	2	2	1	2	1	1	2	1	1	1	3	1	3	1	1	3
History	3	1	3	3	3	2	1	1	2	2	1	1	3	3	1	2	3	1	1
Mathematics	1	3	1	1	1	2	3	3	2	1	2	1	2	2	2	3	3	3	1
Language	3	2	1	3	2	3	2	2	3	3	3	5	2	1	4	1	2	3	1
Cons. A.	2	1	2	2	3	1	1	3	1	1	2	1	1	1	1	2	1	1	3
			D							G									
English	2	2	3	3	2	3	2	3	3	3	2	3							
Science	1	1	2	2	1	2	1	2	1	1	3	2							
History	2	2	1	1	3	2	3	2	1	2	1	1							
Mathematics	1	3	1	3	1	1	2	1	3	1	3	1							
Language	3	3	3 + 1	2	4	1	3	1	3	3 + 2	2	2							
Cons. A.	3	1	1	1	1	3	1	3	1	0	1	3							

These samplings will serve to illustrate the procedure. Even a small school may offer considerable flexibility for its students. Pupil G was preparing to meet a special set of requirements. Pupil D had a desire to extend his major in languages. The plan is submitted as a means of stimulating intelligent choosing. The individual finds in it an opportunity to organize his studies with some design.

It would be administrative folly to select any single pattern and send it out as a chart to be adopted. All such authoritarian methods are inadequate. Freedom to elect any "courses" on the basis of "interest" is likewise folly in the opposite direction. Neither view is tenable nor are the alternatives exhausted. With a compass and some intelligent direction each pupil makes his own chart with a new *principle in action—liberty under the law.*

The student is encouraged to express his judgment and to think his way through the curriculum with a sense of purpose. His opinion is respected. His intelligence is challenged. Freedom within the law is guaranteed. Arbitrary methods are avoided. Reason is capacity which enables the individual to solve his own problems on his own initiative, reflection, choice. The discipline of freedom is opposed to the discipline of repression. Every boy ought to be treated as an individual and have a curriculum of his own designing. This ideal may be launched by establishing some common multiples in which pupils begin to take increasing responsibility for their own progress. Self-discipline within the corporate life of the school will not be despised. The individual learns to make intelligent choices by exercising powers of choosing.

Every time a mode of conduct is imposed upon a person when he might have chosen for himself; every time he is externally directed when he might have exercised wholesome and productive self-direction; every time he is balked in making a mistake that would have been creative experience for him, he will thereby be proportionately less fit to make wise choices, less able to exercise self-control, more helpless to learn by experience. Such is the nature of the preamble to a declaration of worthy self-expression that includes in its emancipations *freedom in work* and liberty under the law.

In a democracy we expect the individual to become an excellent judge of his own abilities and to learn how to take responsibility for his own decisions, not by doing as he pleases but by moving intelligently in the light of the facts at his command. He must learn to estimate his own opportunities. Each individual is a candidate for personality. The individual is charged with the responsibility of discovering himself. That is the great adventure.

A refreshing resolution passed by the regents is inscribed on a bronze tablet at the entrance of Bascom Hall: "*Whatever may be the limitations which trammel inquiry elsewhere, we believe that the State University of Wisconsin should encourage continuous and fearless sifting and winnowing by which alone truth may be found.*"

CHAPTER V

TESTING, A CONSTRUCTIVE CRITICISM

This topic may impress the reader as being a covert method of presenting a partisan view of the testing movement in American education. *Testing—a Mild Protest*, might be a better phrasing. One who has lived through five "fads" in education may be granted the privilege of old age and permitted to comment on the rise, spread, dénouement, and decline of "fads and fancies" in the field of education. However, it is not our purpose to enter here upon reminiscing or to embark upon a wholesale condemnation of any group of earnest workers in educational measurements. The discussion of this topic is based upon data uncritically accepted by so-called experts and non-experts who are making extensive use of the new tests with which we are all more or less familiar.

A popular notion prevails that science is impersonal and that scientific detachment is possible if conclusions can be supported by facts. This belief is a glorious belief if a penetrating distinction is made between a bad set of facts and a good set of facts. To appreciate this point one needs only to ask how science is used by vulgarizers in this "new age of faith." A simple belief in truths supported by objectivity expressed in terms of an arithmetical scale is now so prevalent that it is difficult to direct attention toward a deeper analysis of the main issues of education. There is always the danger of simplifying the problem beyond all recognition. It is well to bear in mind the distinctions among pure science, applied science, and the vulgarization of science. "The finished product of scientific vulgarization is not an inhuman, objective bundle of pure scientific truth, but a personally edited bouquet or bundle, with a carefully blended odor to suit the destined palate. . . . The popular notion that science is 'impersonal' is one of the first errors we are called on to dispel. The *non-impersonality* of science should at all costs be substituted for the idea of its impersonality." *

The ease with which mathematical and mechanical concepts have been applied to thought-processes should be scrutinized. Quantitative measurement has been and is being applied to mental phenomena, as if it were settled for all time that whatever exists must exist in amounts and must be measurable. Some psychological Einstein may yet have to be summoned to lead us out of this Plutonian wilderness into which we have been led. The lure is irresistible. If mathematical thought can be extended to the concrete realities of mechanics, why not to the things of the mind? Mechanical analogues have been freely borrowed. We speak of "intellectual energy" and "intellectual power" as if such phenomena were actually comparable with physical concepts. We forget that our ignorance of physical processes is lamentable. Mental capacities are metaphorically treated as if these indeterminable factors, swimming in an infinitely complex social world, were simple interactions of *two* or *three* mechanical bodies. The results of the interaction of intellectual variables are never what the mathematicians call "symmetrical functions of time." The purpose in saying it in these terms is not to mystify the reader. The only purpose is to suggest the magnitude of the problem. *To discover the form of the function* is a task for the giant minds in the realm of relativity. The mathematical physicist is taxed to the utmost limits of his intellectual acumen in utilizing mathematical scales in dealing with the interactions of three simple variables—the concrete mechanical concepts of *time*, *space*, and *mass*. Mathematical analysis is practically exhausted at this level.

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* Lewis, Wyndham. *The Art of Being Ruled*, p. 26.

"The scientist is, as it were, a correspondent from the front line of Man's attack on the future giving a reasonable account of what he has seen." "*Measurement is relative. Every measurement is right for the conditions under which it is made, and for those conditions only.*" (Shearcroft, W. F. F., in his intriguing book, *Matter, Man and Mind*, gives a background against which the student of education might profitably refer experience.) What would a block of stone weigh at the bottom of the sea if a mermaid were to use a spring balance? What would the same block of stone weigh up above the clouds if the same balance were used by the aviator? Two identically colored rings are not the *same* color on differently colored backgrounds. Place two red rings of *exactly* *the same color*, one on a yellow background, the other on a purple background, and the proof of the paradox is obvious. Such examples might be multiplied indefinitely. Motion is relative. A measuring rod will become shorter in motion. A clock runs faster in motion. The mass of a body increases in motion. It is impossible to think in terms of constants and absolutes in the *physical* realm. What of the backgrounds of temperament against which the art of teaching must be referred? All conclusions about the reactions of minds have only a relative value against the framework of the present. The reference to the color background should lead by analogy to temperament, for one thing, as the background upon which facts are projected. When does a fact have equal validity for all normally constituted minds?

And yet, a popular belief prevails that intelligence can be measured. The amounts of mentality are supposed to be definitely measurable. Here is where pure science and applied science terminate and the vulgarization of science begins. Without stopping to define the human mind or to discuss mental capacities in terms of behaviorism, neo-behaviorism, vitalism, configurations, faculty psychology, native endowment or whatnot, one may remark merely that thought-processes lie beyond the control of independent variables. At all events, whether we think of *what we think our mind is* as a unit-system with new factors at every point of a growing synthesis or that the mind is some sort of an association mechanism or just the resultant of neural reflexes, the fact remains that "intelligence" or "mentality" is far from being defined with sufficient validity to afford a starting point in measurement.

Some gifted children may be discovered by intelligence testing. But to suppose that all gifted children will be discovered and ear-marked in advance of the great adventure of living is a naïve belief not unlike fads and fancies of bygone days. The habit of predicting what people in general and in particular are fit for is so universal that any hint of a scientific method of forecasting is seized upon with swiftness and assurance, and applied ruthlessly without raising the problem whether prediction is ever possible in the realm of mental phenomena. One of the positive results of science is that it is not possible to predict the combination of characteristics that will be produced by any two parents when a new individual is produced and equally impossible to predict results of environing factors in the life of an individual. It is interesting mathematics to determine the forecasting efficiency of correlations. And it is well to be informed that a correlation in a battery of tests of .79 yields a predictive efficiency of about 39 per cent, and that correlations above .60 yielding 20 per cent are rarely secured and that a correlation of .50 yields only about 13 per cent of predictive efficiency. The rejoinder that even 8 per cent forecasting efficiency out of a correlation .40 is better than guessing is perfectly valid, provided prediction is possible in the field in question.

In applying statistical method to the educative process it should be understood that mathematical refinements and corrections are resorted to to make the results reliable and significant. Real teachers know that the results in tests reflect quite as much the conditions of the occasions upon which tests are taken as the alleged ability or mentality which the respondent brings to his task. To quote Bentley * "The occasional conditions are of wide variety—(1) exact manner in which test material is laid before the examinee; (2) manner and appearance of examiner; (3) general organic state and specific neural trends of examinee at the time; (4) previous experience with similar tests; (5) his facility with the pen (if writing, and his training in hearing if dictated); (6) emotional bias; (7) inclination to do well; (8) the motives which tend toward, or (9) away from, high accomplishments; (10) the facility with which the subject comprehends what he is to do; (11) his aptitude for immediate absorption." All these factors, and many more, lie outside that ability or those "abilities" which the test is assumed to measure.

An illuminating example of the proposition just presented is found in a trick played by the professor on his class (a university class of some 75). A *true-false* test was fabricated consisting of 100 items. Each statement was a "true" statement. In the total mass score 40 per cent of the answers were recorded *false* by these students. There is a strong presumption that this test did not test the abilities of the students to react to the *trueness* or *falseness* of the statements submitted, but rather it was a test of the *power of suggestion implicitly carried in the catch-word stereotype*—true-false. Expectation that some statements must be false preoccupied their minds as an obsession. One might dilate at length on the dangers to the intellectual life lurking in stereotypes and in blind devotion to ready-made patterns and in the prevailing habit of rationalizing beliefs. The only observation we desire to record here is the fact that the professor's true-false test was a test of ability or abilities which the test did not assume to measure. It might be regarded as a kind of intelligence test—a test of the sagacity of the students perhaps. If so, then the test has rather high validity. In general, would it not be a scientific procedure to establish what the tests measure, and when they measure what they are supposed to measure?

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* Bentley, I. M. *The Field of Psychology*. The entire chapter on "The Limit of Function" is exceedingly illuminating.

The precautions taken to relieve the crudeness of the score by statistical devices should be regarded. Splendid academic courses are now offered in educational measurements. The high respectability which courses in statistical method have attained is a good omen and the general effect in the tendency to lift pedagogy out of its low estate is all to the good. But we ought to know what it is all about. Measuring the tracks, the reaction-time and the finger marks, a boy has made, reducing the findings to tables, smoothing out the curves, introducing the critical ratio, making comparisons with another boy's tracks, computing correlations, making corrections, establishing forecasting efficiencies and the like—all this business affords a rigorous training in mathematical scales and statistical method. The only observation we are concerned in making is the fact that the boys have moved on and disappeared long since round the corner. And the point of it is perfectly obvious. It is not possible to tie up all these old absolutistic categories with *growth*, with a creative significance. "The moving finger writes and having writ moves on." The elusive pursuit of either constants or independent variables may be fascinating. If confusion could be avoided, the pursuit itself would furnish a stimulating challenge. It is the practice of closing doors and tacking on labels to which we object. The testing movement interpreted as a method ought to prove invaluable. But it is only a method after all. Those who use it abundantly and aspire to lift it to the dignity of the scientific method will not forget that science is a program of attention to crises. Labels and definitions are not stuck on life as absolutes and finalities by scientists. Only vulgarizers of science are doing that.

All of this long introduction is not designed as a mild protest. Rather, it is hoped that our simplicists will not be quite so positive.

The mathematical scale has made possible our marvelous technology. But to have a technology without craftsmanship is just to be swindled again by progress. The crying need of education today is to find a clear and distinguishing and workable statement and definition of what can be and what cannot be, of what ought to be and what ought not to be subjected to the standards of quantitative measurement. The alternatives are not to take to philosophy or drink.

The first requisite, as we see it, is to be sure that we are not deluded by the number system. Equal units of difference in a scale and the point of just no mastery are not easily established. The calibration of a thermometer is an outstanding achievement of the human mind. The physician or the nurse, anybody, for that, can read the temperature of the patient. It is an entirely different proposition to interpret the readings and to know what to do with the results. What are the symptoms? What is the disease? How is the patient to be treated? What does the physician do? We have heard about the nurse who persisted in waking up her patients to give them their sleeping powders. Too often pedagogy has been just that. What is the proper place of art and common sense in the rôle of the physician? Does he not use his scientific knowledge to refine and direct his common sense?

There is a vast deal of testing going on today in our schools and colleges. What inferences are being made? Are symptoms being confused with what they ought to signify? We have a confusing number of scales designed for the readings of the performances of the examinee. What capacity are we developing to get back of the mere recording of hurdles, made and not made, to that ancient and honorable business of coaching or teaching? The prevailing disposition is to classify and to indulge in lazy prediction. It is so much easier to rest in the conviction that "John can't learn it" and prove it by pointing to his IQ or his score in some test, new-fangled or otherwise, than to coach or teach in the faith that human nature can be changed and that effective direction of work will lead to mastery and understanding.

Our second suggestion is, therefore, to bear in mind that the primary purpose of education is to educate. "Lest we forget!" It is the business of the teacher to work on the conditioning factors in the educational situation so as to make possible and imperative, understanding in a positive, on-going, creative procedure.

Another principle to be recognized is the proposition that giving correct answers or incorrect answers in a series of related or unrelated circumstances cannot be accepted as valid evidence of knowing or not knowing the correct or the incorrect answers. There is something creaking in all this business of reporting *the* correct answer. We have unwittingly reinstated the puzzle stage of education in the new tests. Moreover, when we try to think of *growth* and how to fashion general method along problem-solving lines in creative adventuring, so many of these old categories appear as ghosts parading about where they are not wanted.

To get at a definite situation now in the light of some of these fleeting comments and some evaluations subsequently: Following is a grammar examination consisting of 20 things to be done about it on three sentences.

In administering this test to 31 twelfth-grade pupils the sentences were written on the board, one at a time. The pupils were given a sheet of paper (4 x 6 is large enough) on which to record their answers, which for the most part in this test were just a word, *true* or *false*. In one case, the multiple-choice type appears and in one other just the ordinary examination form (writing the independent clause in the sentence).

With the sentence on the board (and a vigorous leadership in directing a thoughtful study of it) the writer conducted the examination with an assistant. (Any teacher can do it alone or call on a pupil to assist.) The assistant read the statements one at a time. If there was any doubt the statement was repeated as the examiner pointed specifically to the part of sentence involved.

By way of parenthesis, we make bold to remark that there is tragic confusion in these times in the use of mimeograph matter. There were some excellent books in the last century on Grammar. The completion form of test was employed on page after page. The texts were organized with a genuine progression. The pupil had his instructional materials in some order even if prearranged for him. The difficulty with *mimeograph* teaching (this glorified correspondence-school method) is that the stuff is just about as loose in the minds of pupils as the sheets are themselves in the hands of teachers and pupils. It is well also to bear in mind a practical detail. Schools are not equipped with either apparatus or stenographic help to run off mimeograph material in wholesale fashion. It is doubtful if it should be done. There is something to be said for a good text book in which the pupil may find a way of developing a rational dependence on authority and to which he may turn in his search for the lost chord or by means of which he may get a connected view of the whole, etc. One can absorb mimeograph matter as readily as text-book matter. It does not follow that one has to become a slave to the text book.

Returning to the procedure: It is economical to conduct such an examination by dictating the statements. It is a different approach. It may be that excessive devotion to *reading* has a bearing on the capacity of people to react to oral announcements and directions. It may be too that the latter is becoming a lost art. Perhaps properly so, now that nobody is commanding and nobody is obeying! We who work with boys and girls and college students find that what we tell them by word of mouth usually fails to register. In this examination every precaution was taken to see to it that every pupil understood the statement. In case of doubt, parts of the statement were written on the board. True, this procedure introduces the personal equation. We are quite sure it ought not be deleted. (The written examination is easily made a fetish.)

Ample time was given to write the one word (or more in two instances) required. When written the pupils were asked not to erase or change their answers. It will be noted that 4 in I answers 3 in the multiple choice. Any pupil not clever enough to go back to 3 when he sees 4 shows little capacity in seeing relations. Direct learning is at low ebb for him. There was no temptation to resort to revision. What we sought was a penetrating analysis of the statement and a direct answer.

Emphasis is laid on the *psychological* method in the belief that it should be utilized with the *test* method if we are ever going to clear up a bewildering situation. In this examination the control factors were in hand. There was no disposition to develop secret codes of communicating answers. Each answer recorded is the individual's own answer. Clever students are able to devise subtle means of communication in tests and examinations. Exhorting such students to be honest is futile. The leader can by gestures tell his gang (sometimes the whole class) the correct answer when the mimeograph sheets are distributed, and when the examiner resorts to the perusal of post-mortems at his desk or parades as a detective. (Be it remembered that ethical injunctions delivered to our students and children are endeavors to make them better than ourselves.) This test was not administered in the conventional way. The examiner entered dynamically into the procedure with a cautious, directing eye to *see* that attention was at every moment on the particular issue involved. The suggestion is that a problem or question can be written on the board and these economical methods of testing carried out without resorting to written questions. Each pupil in this examination wrote just 18 words in answering 18 of the 20 statements. There is no difficulty whatsoever in checking. It is an incidental point but worthy of mention: There is an unwarranted waste of good white paper in this mimeograph fad we are passing through.

After the pupils had written their answers, they were directed in each case to write the sign (+) above any answers if there was any doubt about the "correctness" of the answer. We are convinced that we secured here a fairly genuine and valid judgment from each pupil.

Now there is no objective, verifiable, impersonal evidence that these pupils placed a (+) above in every case of doubt or confusion. Objectivity in things of the mind is for the most part a millenial ideal, unless of course we become mechanistic behaviorists and identify thinking with the muscular performances of the larynx. Even if a mechanistic view of mind is accepted, it will still be conceded that the ultimate decision lies with the free initiative of the spirit. This is the point where the *psychological* method was introduced to throw, if possible, some light on the *test* method.

EXAMINATION

Mark each statement, *true* or *false*, or fill the blank within the sentence with the correct word or words.

I

The Bishop felt without perhaps expressing it that something within the old man had suffered extinction.

1. The words "that . . . extinction" are a substantive clause in apposition with "it." ......

2. *that* is an introductory word in the substantive clause. ......

3. *expressing* is a verbal noun gerund infinitive participle (check a correct term of these four) used as object of the preposition *without*. ......

4. *It* is object of the verbal *expressing*. ......

5. The words "that . . . extinction" are a substantive clause, object of the verb *felt*. ......

II

It is believed that the molecules are in rapid motion and that one molecule moves in a straight line until it strikes another, when it rebounds and again moves in a straight line.

6. "that one molecule moves in a straight line" is a substantive clause, direct object of the verb *is believed*. ......

7. "in rapid motion" is a phrase used as predicate nominative (a predicate adjective) after the verb *are*. ......

8. "when it rebounds and again moves in a straight line" is an adverbial clause modifying the verb *strikes*. ......

9. "that . . . motion" is a substantive clause subject of the verb *is believed* or in apposition with *it*. ......

10. "when . . . line" is an independent (principal or co-ordinate) clause. ......

III

The reason why men succeed who mind their own business is that there is so little competition.

11. The independent (principal) clause (write *all* of it) is:

....

12. *why* in this sentence is an interrogative adverb. ......

13. *why men succeed* is a substantive clause in apposition with *reason.* ......

14. *who* is a relative pronoun, subject of the verb *mind.* ......

15. *who* is a relative pronoun connecting the second adjectival clause to *men.* ......

16. *there* is the subject of the clause "because . . . competition." ......

17. *why* is an adverbial modifier of the verb *succeed.* ......

18. *why* also connects the clause which it introduces to the noun *reason.* It is therefore a *relative adverb.* ......

19. The clause "that . . . competition" is a substantive clause used as predicate substantive (or predicate nominative). ......

20. This sentence (III) is a compound-complex sentence. ......

On the chart 20 correct answers appear in the first column.

A. The number of pupils recording the correct answer.

B. The number of pupils recording incorrect answer.

C. The number of pupils giving the correct answer but in doubt about the correctness of the correct answer.

D. The number of pupils giving the wrong answer but in doubt about the wrongness of their answer.

E. The number in error who did not enjoy the consciousness of error.

It will be observed that in I, 1, ten (10) pupils recorded the correct answer by writing the word *false*, and 21 pupils wrote *true*, the wrong answer.

31 PUPILS RESPONDING. 12TH GRADE. W. H. S.

TRUE-FALSE CORRECT * ANSWERS	A NUMBER OF PUPILS RECORDING CORRECT ANSWERS	B NUMBER OF PUPILS RECORDING INCORRECT ANSWERS	C NUMBER ANSWERING CORRECTLY BUT IN DOUBT	D NUMBER ANSWERING INCORRECTLY BUT IN DOUBT	E NUMBER WRONG BUT NOT ENJOYING CONSCIOUSNESS OF ERROR
I.					
1. False	10	21	9	18	3
2. True	31	0	4	0	0
3.* One of four *verbal noun*	12	19	7	12	7
3. True	15	16	5	11	5
4. True	28	3	9	1	2
5. True	28	3	0	3	0
II.					
6. False	1	30	0	9	21
7. False	23	8	10	4	4
8. True	27	4	6	3	1
9. True	23	8	1	3	5
10. False	25	6	2	5	1
III.					
11.† The reason is	1	30	‡	‡	‡
12. False	17	14	4	12	2
13. False	10	21	2	8	13
14. True	29	2	0	0	2
15. True	26	5	4	3	2
16. False	13	18	3	3	15
17. True	21	10	9	4	6
18. True	16	15	4	7	8
19. True	24	7	7	4	3
20. False	17	14	5	1	13

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* Choice of answer by checking one of four.
† Write independent clause in sentence III.
‡ C, D, E, not applicable.

Now the significant part of this study appears in the fact that 9 *of the* 10 *who answered item* 1 *correctly were not sure of their answer and* 18 *of the* 21 *who answered it incorrectly were confused or in doubt about their answer.* One of the 10 seemed to be secure in his understanding. Three of the 21 did not enjoy the consciousness of error.

If, as we suspect, these judgments are valid a flood of light is shed on the testing program.

Note again in I, 3, in the *multiple-choice* type. Twelve pupils wrote the correct words and yet 7 of the 12 were in doubt about the correctness of their *correct* answer. And 19 wrote some one of the other three alternatives (most of them writing "participle"); but 12 of the 19 were in doubt about their choices, and 7 of the 19 did not enjoy the consciousness of error.

From an educational point of view the 9 of the 10 in I, 1, and the 7 of the 12 in I, 3, on the one hand, and the 18 of the 21 and the 12 of the 19 on the other are all in the same boat. They belong together when we are concerned with *understanding* as the main objective in the educative process.

And there is a large element of doubt in the 100 per cent perfection score in I, 2, in view of the scores on the word, *there* in III, 16. It is barely possible that the form of the statement is such as to revive an association on a bit of recent drill on the word *that* as an introductory word. If these students had been asked to dispose of the word *that*, the score would have been far from perfection.

The main contention is that "correct" answers and "incorrect" answers to statements, framed as illustrated in this examination, have very little reliability and often no significance at all. Mathematical refinements, corrections, and statistical devices will in no sense alter the fact that the substantive clause, the verbal noun, the independent clause, and so on, present specific difficulties to be met by vigorous methods of study and teaching if they are ever to be mastered. These things we know already. It is extremely doubtful if such a test discloses the real problem or points the way to better teaching. The reliability of the answer given is challenged.

There is no basis offered for a comparative study of scores within this array. One cannot say with any degree of assurance that the fundamental principles involved in I, 4 and 5, have been better taught than those principles tangled up in II, 6, and III, 11. A better score or a poorer score in this examination is practically meaningless.

There is no point in such a test as this one in figuring out the "averages" and in comparing the scores of individual pupils. Two pupils may have the same average grade and yet vary widely in their performances. One appears to have a working mastery of independent and dependent clauses: (the correct answer III, 11, by the way, in this test was registered by a pupil who had made an excellent record in geometry where the *hypothesis* is the dependent clause and the *conclusion* is the independent clause). The other pupil scored high in the transitive-verb-passive-voice challenge. The average scores are evidence simply of the average performance value assigned to the pupils in these topics. That means that pupils are on the road to mastery with more or less progress in this and that item of the subject. As Morrison says, "There is a vast difference, in the learning situation, between saying 'This pupil has worked seven of every ten exercises correctly' and being able to say 'This pupil has definitely caught the central idea.'" *

As to the reliability of scores in the *true-false* type, we are admonished to go beyond a certain number of cases in order to be sure of the reliability of the score. For example "A true-false test of less than 40 items is not valid." "A completion test of less than 20 items is not valid." Etc. No doubt this precaution should be observed in relieving the crudeness of the score by statistical devices. But endless multiplication of statements out of which the "true-false" answer is to be extracted will in no way alter the fact that Mary does not have a mastery of the transitive verb and that Henry has lamentably failed in detecting the independent clause. And these ideas are central ideas. They are not just lacunæ in a vast tesselation or mosaic. The real problem is to establish a searching mastery of central ideas. If Mary and Henry could produce the correct answers in 49 out of 50 items and still fail, each in his own item, the total scores, though high, and identical perhaps, would not change the situation with respect to Mary's and Henry's understanding of transitive verb and independent clause.

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* Morrison, H. C. *The Practice of Teaching in the Secondary School*, p. 43.

Nothing has been said thus far about the element of chance (the gambler's chance) in the *true-false* type as well as the *multiple-choice* type and to some extent in the *matching* and *organization* types. Always, no matter what the number of items, there is the element of sheer guessing in each individual item. No matter how many items are included in the test, the examinee faces one at a time and the element of chance enters psychologically when the single item is being disposed of.

A student reported this case—her own experience. Her room-mate was an assistant in a course in psychology. A true-false test was constructed for the psychology class. The items in the test were selected out of the text used in the course. This student asked her room-mate to let her answer the test. She wrote *true* or *false* at random without reading the statements. Out of the 42 items she got 23 correct. Then she wrote the answers a second time after reading each item carefully. Her score was 39 correct in the second trial. Now the interesting fact is that this student never studied psychology and was totally unfamiliar with the text used. She read each item in the second trial and weighed every one carefully using her common sense. All sorts of inferences may be drawn from this case. The only one we are concerned about, and a true-false test may be instrumental in raising productive inferences, is the probable place of *direct* *learning* in our schools and colleges and the desirability of working out a general method that would offer opportunity for explicit recognition of such important phenomena as *direct learning*. It is a real problem and if we were disposed to search into it, there is no doubt that it would make a difference in the whole procedure of teaching and learning.

Can any good come out of such testing? This particular set of scores? Decidedly, yes!

1. It has afforded the writer an opportunity to discuss (in more or less "objective" terms) his philosophy of the testing movement and some other things concerning education.

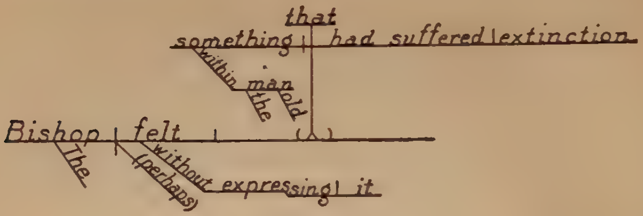
2. If any teacher is in doubt about the capacities of pupils (in the ninth to thirteenth grades inclusive) to exhibit a bowing acquaintance with the concepts involved in II, 6, and III, 11, this sort of test should be revealing. It is obvious that the transitive verb, active voice and passive voice are just about as extinct as the dodo in the mental equipment of modern youth. To be able to disentangle such a grand mix-up of linguistic involutions as occur in III, 11, presupposes some very remarkable teaching together with a correlative intellectual energizing on the part of pupils in a drive for mastery ideals.

We are not seeking to discredit new methods of testing. What we are emphasizing is the need of creative, responsible, and vigorous *teaching* and testing. There is no end of making inferences from a chart such as the one used in this study. The important thing is to work for understanding and to guide boys and girls in the creative adventures of the intellectual life.

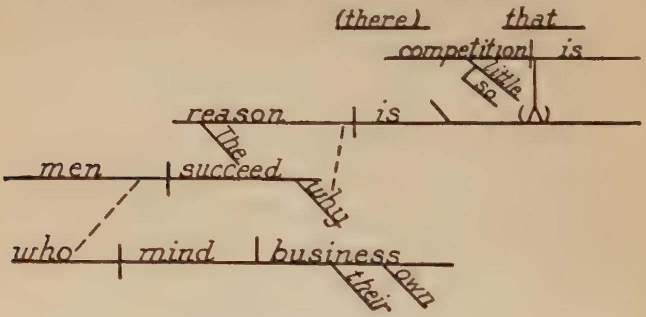
One boy remarked as he finished this test, "I don't learn anything in this sort of test because I am always thinking of what is wrong. I am thinking of my mistakes. I don't get any help in seeing what is correct." In another test of the new variety wherein a mess of words and unpunctuated sentences (unrelated) was submitted, the task being to locate the sacred comma and the like, a youngster said that he saw no sense in doing it, but that he would like to write something and try to make it clear by using punctuation and by arranging sentences in sequence to express the direction of his thinking.

Some of our old-fashioned friends who were brought up on technical English Grammar and some excellent system of diagramming might very properly urge that the three sentences used in the examination above could have been submitted as a test with just one simple direction: Diagram them. No doubt everything pertinent to the object of the test (and more) that was disclosed in the twenty statements about these sentences would be disclosed in some good system of diagramming. The checking would be just as easy if not easier than in a true-false test or a completion or multiple-choice type of test. Some pictures with bases of common understanding would appear such as are shown on page 244.

There is not the slightest doubt of a pupil's understanding of the substantive clause if the diagram sets it out as the object of the verb *felt*. The little device



of a broken line tells the story about the verbal noun *expressing*. The locus of *it* on the line after the verbal noun *expressing* indicates the fact that the pupil who puts it there knows what his motions are about. And, moreover, the thing is done without leading or misleading statements. For example, the statement in III, 4, above, discloses the answer to the preceding statement. All *that* is avoided in the old-fashioned procedure in which the only stimulating statement is: "Diagram the sentence!"



And the pupil who sets up the sentence in such a clarifying diagram is presenting "objective" evidence of overtaking the ideas expressed in this sentence. He has answered dozens of questions that might be formulated about the sentence, and again he has not been diverted or confused by isolated and fragmentary details. He has a chance to see the elephant as a whole. If he places *why men succeed* in a form which by the rules of the game is accepted as a graphic method of indicating an adjective clause with *why* meaning *for which*, there can be no doubt about his understanding. The picture is self-explanatory. There is no idle and slippery guesswork about it.

This argument is no doubt hopelessly old-fashioned and belongs to the ancients in education. Yet we beg to insist that it is not a case of reviving fond memories.

Diagramming does offer an "objective" means of presenting a complete analysis of sentence structure. That which is objective links up with the modern contention in educational discussion. There is a unit-whole in the diagram in so far as the sentence is concerned. That idea is up to date also. The elements of the sentence tend to hang together in the diagram and this fact suggests that they might pull together a little better in the boy's mind. The diagram, if a thorough-going one, intrigues interest. It is never a stereotype. One gets on to the fine points of the game, learns the rules of the game as it were, and then figures out the chameleon-hued sentences and represents one's own interpretations within the general guide lines agreed upon in the system of diagramming adopted. An endless variety of patterns may be studied. The challenge is to represent in a graphic picture the meaning one derives from an analysis of the sentences in hand. A common multiple, a frame of reference or a scheme is furnished in which common understanding is promoted, and at the same time scope for originality in the fact that there is no limit placed upon the number and variety of sentences that can be brought within the common multiple or diagram.

The situation is comparable, in a way, to the general *method of proof* in geometry. There are certain rules of the game of intellectual thinking agreed upon. The method of proof is not a stereotype. It is not a prescription to be filled. It is rather a set of principles to be observed. A mastery of the method of proof could in no conceivable way interfere with originality. Rather, the method of proof tends to liberate the mind for adventuring far out on the frontiers of original exercises. *System is not inhibitive if it is used to free the mind for new enterprises.* It is only when intelligence runs into habit and loses itself in blind alleys that system and organization become dangerous. If system is superimposed as a scheme to be followed blindly through cut-and-dried courses, a bit of the dynamite of originality should be used to break up an ancient custom.

The query may arise: What is the testing movement replacing? The answer is difficult. If technical grammar and the method of proof in geometry are thought to belong to the era of mental discipline, it may be in order to remark that a chaotic period followed that era. The doctrine that "you train only what you train" under the dogma of mental "contents" and the substitution of *sensation* for *intellect* may be cited as a period of confusion. Suffice it to say that it is exceedingly difficult to direct attention toward central ideas.

A distinction may be made between testing and creative learning. In the latter we need guide lines, organizing principles, central ideas, unifying and comprehending principles, schematic designs, general method of proof, general modes of attack, frames of reference, common multiples, themes (in music), emerging unities (*e. g.* electron-complex), and outlines and diagrams and unit systems or wholes and the like. We need new tests as well—tests that will disclose mastery and understanding of central ideas. We need tests also that will enable the examinee to build up a dependable sequence of unified thinking in which he feels the necessity of moving on to the next step by reason of the fact that a previous step has been taken. It is a great achievement when the word *therefore* gains a functional meaning in the processes of reasoning. The flitting about in a glorified puzzle type of test from one isolated fact to another without sequence or definite *interrelating* may, at best, be an inadequate testing of fragmentary items of knowledge held loosely in the mind. Or the test may be composed of just a lot of different things that can be counted.

The highest form of testing will continue to be that type of examination in which questions and problems are submitted to boys and girls, not to find out what they know, but to stimulate curiosity, to provoke and promote thought, and to guide mental life in a creative challenge.

There is a story that when Zola's remains were being removed to the Panthéon, an anti-Semite fired a shot at Dreyfus. In the trial, the defendant made the plea that he bore no hatred toward Dreyfus, that he had not even aimed at him. "My gesture was symbolic, and I fired a shot at an idea."

Is it practical? Is the ideal practical? That question calls for its complement. Is practice ideal? Those two questions go together. Are we merely to rearrange our mental furniture? What of it? Are we moving toward a vital consideration of the fundamental substance of education? If so, is it to be done by impoverishment or by enrichment? If not the latter, the situation is hopeless. We have presented a challenging picture. It may hold little or much to intrigue interest. It is an idea we find practical. Some philosophy every man has, whether he articulates it or not. A teacher without a guiding philosophy of life is, at best, only an artisan. The artist teacher need not spurn a wholesome cultural efficiency. Where there is no vision . . .; well, let Haydon finish this little story. "Once more the effort must be made to realize the dream, to distill out of this tiny bit of cosmos and this little stretch of time a strain of music glorious, thrilling, beautiful."

SUMMARIZING EXCERPTS

1. In the projection of the thesis of this book we are frankly recognizing the value of that body of growing opinion that sees in both the living school and the self-active individual something that is "self-adaptive, self-repairing, self-perfecting, self-regenerating, self-modifying, self-resourceful, self-experimental, self-creative"..............................Page 172

2. System is not inhibitive if it is used to free the mind for new enterprises..............................Page 246

3. If we are to have "orientation" courses, we ought to be concerned about some definite program of *orienting* the *orienters*..............................Page 1

4. Freedom in work and liberty under the law may be conceived as a third system of life, and may become a basis for a new philosophy of education, and then a *modus vivendi* which will suggest a liberating technique for the schoolrooms of the land..............................Page 6

5. The daily "lesson" must go. It fits nobody. Units of learning, comprehensive in their nature, will be substituted for "lessons"..............................Page 10

6. No longer will teachers be found examining the finished product of their students and rejoicing over student failure. Page 11

7. For any minimal essential of content a richly diversified maximum of content within guiding common multiples is provided..............................Page 15

8. Differences, and not similarities, make possible the corporate life..............................Page 16

9. Pupils are not segregated; their work is constantly integrated. No upper limit for any pupil, working within the general circle described, is a phrase we need to get into action and attach it to a teaching verb that will have no equivocal meaning..............................Page 26

10. There will be no need of apprehension where there is freedom in work (leaving no doubt about either work or freedom). Page 30

11. Three major movements in a unit of work: (1) Problem-raising movement, (2) Directing-Study movement, (3) Organizing, Unifying movement. . . . . .Page 32

12. This comprehending principle is the vital common essential. . . . . .Page 57

13. The whole contract in its integrated form will stand out as an alluring "prescribed temptation". . . . . .Page 60

14. Why not classify teachers and professors (the *finished* product) into A, B, C "ability" groups, and let students know that they are not only electing "courses," but also A, B, or C professors and teachers? . . . . .Page 65

15. Performance is only a means by which the teacher is to form a judgment concerning a continuing mastery of central ideas. . . . What a pupil does without effort in his contract is seldom worth checking by the teacher. . . . . .Page 67

16. "Well, Franklin! Why don't you master them?" His reply was refreshing. It was: "Why? What's the hurry? I'll have them again next year.". . . . . .Page 87

17. Any teacher, educator, or administrator who stops at this station has missed the point of the adventure. Any one who would try to retrace the steps in these journeys, in these charts, will lose the trail utterly. Just a sense of possibilities, perhaps? Page 116

18. The best assignments will not be made in formal ways; the best teaching will not be the kind of performances ordinarily so labelled. . . . . .Page 115

19. Man is now challenged as never before to live up to and with his environment. . . . What must be done is to demobilize and disarm the old irrational ideas, the old moribund methods, etc. . . . . .Page 117

20. "Lecturing is that mysterious process by means of which the contents of the note-book of the professor are transferred through the instrument of the fountain-pen to the note-book of the student without passing through the mind of either." Page 120

21. The students had a chance to see a master mind at work, now and again, in that intimate sense which genuine participation suggests.................................Page 135

22. To be recognized as a partner in research magnificent might be the means of creating a new attitude toward scholarship..Page 136

23. But winds of doctrine change. Just now "infantile environment is beginning to replace heredity as the passing deity of science." . . . The behaviorists are moving an amendment to the declaration of the founding fathers so that it will read as amended: "All men are created equal *at birth*".........Page 143

24. "Before any test of intelligence is made up, such construction must be consciously and consistently guided by a clear conception of what intelligence is taken to mean"........Page 148

25. The point is to remember what sorts of things and ideas and scores are being reduced to arithmetical ratios and number scales..Page 159

26. If the curriculum presents in one isolated corner of specialization the flower and in another fenced-in course the bee, the act of relating (creating) may not occur to the student lost in the highly specialized art of mumbling terminologies...Page 165

27. In the great adventure of becoming an individual, in the challenge to worry enough to be an individual, in the daring suggestion to be disturbed enough to think with independence and to follow the argument where it leads, we find ourselves, at once, in a paradox of contradictions................Page 173

28. One of the greatest obstacles in the solution of any vital problem pertaining to human welfare is the reminiscent liberal repeating sedulously the old shibboleths, remembering conscientiously the truths of dead yesterdays...........Page 175

29. The real issue lies in the fact that democracy has been superficially examined, found difficult, and left untried. A start may be made by acquiring a vocabulary of good words: coordinate, integrate, unify, interpenetrate, associate, harmonize, correlate, contribute, interrelate, interweave, compound, reciprocally relate, create, share, participate. A vital democracy will be realized only by carrying out the function of *verbs*. It cannot be done with *nouns*. Nouns as slogans carry too easily the vested

interests of inertia. After getting a few democratic *verbs in action*, it is well to introduce some good phrases and nouns: partnership, corporate life, unity, sportsmanship, emerging unities, cooperation, organization, process, creativeness........Page 178

30. The college must decide honestly and unflinchingly whether it wants to attract and then satisfy active minds and ardent spirits, assured that *truth is the intellectual activity of* the spirit..Page 184

31. Status has always robbed man of his critical faculty. How difficult it is to reconstruct an individual once labelled! Status cuts wide and deep and insinuates itself into democratic life in every conceivable manner....................Page 182

32. (1) "Man *is* what he *was*. (2) Man *includes* what he *was*. (3) Man *is* what he may *become*."—(Otto)...........Page 186

The greatest thing on this planet is *realization* and never mere acknowledgment or remembrance....................Page 188

The central idea of this book is conceived to be an application and an elucidation of the doctrine that every individual *is* what he may *become*..................................Page 188

33. Truth will not be discovered in a society that asks what it is good for.................................Page 198

34. "Whatever may be the limitations which trammel inquiry elsewhere, we believe that the State University of Wisconsin should encourage continuous and fearless sifting and winnowing by which alone truth may be found".........Page 220

35. "Once more the effort must be made to realize the dream, to distill out of this tiny bit of cosmos and this little stretch of time a strain of music glorious, thrilling, beautiful."—(Haydon.) Page 248

36. Freedom is never a donation; it must be won continually. Education is not bestowed; it must be everlastingly achieved. A prima donna remarked that climbing one peak will never be a substitute for the efforts required in climbing another. After winning great distinction you have to begin all over again. Page 191

37. Every pupil is expected to work in the integrating contract at those points where energizing is most productively exemplified....................................Page 106

38. A set of lines sweeping in one direction meets a set of lines sweeping in another direction. Something is going to happen when they meet. When two traditions meet, a new culture is in the making. When differences meet, a new creation is produced.......................................Page 108

39. The building of a mind expectant of change and forward looking may well be conceived to be a working definition of education in one large circle of curricular interests........Page 109

40. "To blow on the coal of civic honor until the whole nation becomes incandescent" has been the dream of educational statesmen. . . . "No man's land" of the intermediate grades (4th, 5th, and 6th) will soon be penetrated by scientific and creative workers...................................Page 164

INDEX

Achievement scores, in relation to intelligence scores, 201–203; and what they disclose, 238; reliability of, 240.

Adjustment, a study of pupil, 203–208.

Adventure, education as, 7, 71, 83, 99, 190; creative, 191.

America, a new social order, 5; meaning of, 178–180.

Answers, the right and wrong, 158; value and validity of correct and incorrect, 234–240.

Aristocracy, surviving forms of, 176–177.

Assignment, indeterminate, 10; no upper limit, 15; definite guide-line, 20; contract way, 53–116; conventional, 121; in university by new plan, 133, 137; and grade to be made, 138; of tasks in feudal days, 180.

Assumption, of equality, 140; changing forms of, 143; concerning persons, 150; as to individual capacity, 195–197.

Attitude, problem-solving, 35; creating enthusiasm, 36; creating new, 70; of pupils in a challenge, 112; "get by," 138; reflected in achievement, 166.

Becoming, a philosophy of, 190; biological basis, of, 192.

Bentley, I. M., on limit of function, 226; on variable factors in measurement of ability, 226

Biology, a contract in, 111; and education, 143; biological inheritance, 187; Dendy's *Biological Foundations of Society*, 192.

Capacity, working up to, 105; challenged in contract plan, 138; and "transfer," 164; to become, 190.

Central ideas, basis of challenge, 69; pulsating, 57, 81.

Challenge, a philosophy of the, 9; and the work-spirit, 20–24; interest in, 34; creating a, 55; without guarantees, 62; in a moving synthesis, 81; of modern world, 118; illustrated in art, 127.

Character, built in stream of life, 190.

Chromosomes, possible patterns of, 194.

Classification, border-line problems in, 61; grouping teachers, A, B, C, 64; "those who" fallacy, 79; guides to be observed, 139; by IQ, 150; according to Strasheim, 151; on a psychological basis, 151; judging persons by, 173; and doctrine of classificationists, 139, 143, 169, 186; reliability of data used in, 195–205; and lazy prediction, 230.

Clutton-Brock, A., on pursuit of truth, goodness, and beauty, 198.

Coit, Stanton, on meaning of America, 179.

College, who shall go? 199; preparation for, 210–215; relation to secondary schools, 215–218.

College Entrance Board, 95.

Coloration, protective, 71; in Yankee cleverness, 87; acquiring protective coloration, 139; in college degrees, 184.

Compass, in terms of guide lines,

20; as distinguished from charts, 53, 111; as an aid to initiative, 163; providing youth with, 189.

Conceptualization, in relation to mental testing, 151; as means of hitting upon suitable responses, 156; creative act of, 158; and practical experience, 167.

Contract Plan, *in contrast* with lesson, 14 ff.; as a moving synthesis, 20 ff.; illustrated in geometry, 52–56; principle of, 53; three levels, 54 ff.; and school marks, 54–55; extension by, 66; "set up" inductively, 75; shift of materials in, 86; opposition to, 92; illustrated in biology, 111; in university classes, 137.

Cooperation, achieved through technology, 2; in differences, 16; within guide lines, 20–30; by means of directing study, 37–40; within comprehensive units of learning, 52–60; in constructing a contract, 100; in organizing movement, 115; in productive work, 134–136; by process of interrelating principles, 247.

Correlation, coefficient of, and percentage of prediction, 195–196.

Curriculum, bound by tradition, 189.

De Hovre, Fr., *German and English Education*, 3, 4.

Democracy, a changing ideal, 175; as extension of privilege, 177; to be realized with verbs, 178; and education, 183.

Determinism, an antidote, 7; a new sense of direction, 55; in the light of a challenge, 99; checked against achievement, 111; overcome by a university professor, 138; a scientific corrective study of, 201–209.

Diagnosis, on basis of achievement, 136; through tests, 204–208.

Diagramming, economy of, 243–245.

Differences, and corporate life, 16; provision for, within unifying principles, 20–30; met in a circle described, 30; in relation to phases of unit, 50; sharing, 89; revealed in working forward, 100; in marks, 137; as revealed in tests, 151; accounting for, 152; appearance of, 170; established in terms of social customs, 188; in scores and items in battery tests, 204–208; unclassifiable, 209.

Differentiation, in materials of instruction, 53, 99, 111; in school marks, 55, 137; endless, 170.

Directing Study, contrasted with criticism, 11; by means of guide lines, 20; description of, 40; by discovering central ideas, 81; by organizing materials of learning, 101; movement in a science, 115; illustrated by painter, 127.

Discipline, voluntarily suffered, 6; in freedom, 25–28; through gripping principles of thinking creatively, 55–60; self-discipline in a contract procedure, 111–115; of freedom as opposed to discipline of repression, 219.

Discovery, out of searching and mastery, 16; of form, 74; of individual through testing program, 196–200.

Discrimination, judging persons by, 174.

Drawing, key lines in, 20–27; place of constructive arts in secondary education, 211–218; a distinguished teacher in, 127–130.

Education, general, 78; by and for individuality, 100; task of, 109; the situation, 117; an indictment, 118; as communication of belief, 140; limits of, 145; through inquiring types of problems, 158; universal principles of, 163; made universal, 176; for privileged class, 177; inter-

preted in American ideals, 179; by participation and the system, 180; and status, 181–183; adult, 184; the challenge of creative, 189; building a mind, 190.
Eduction, of relations, 151; practicing ground for, 156; process of, 157; suitable, 160; organizing materials for, 161; cultivation of, 164; the basis of creative education, 164.
Electives, electing marks, 137; in junior and senior high schools, 210–214; in relation to college, 211.
Empirical concretes, rising to level of, 155.
English, a creative challenge in spelling, 12–16; procedure illustrated with irregular verb, 85–90; a contract in, 99–104; in secondary school, 211–213.
Enrichment, provision for, 38; through integrated contract, 82; in verbs even, 85; in building units, 98; qualitative, 107.
Environment, of ideas, 118; and the behaviorists, 143; social, 187; determinant in man's becoming, 190; never a constant, 209.
Equality, moral, 175; the practice of the doctrine of, 176.
Essentials, replacing minimum, 15; common, as principles, 35; a new meaning of, 36; of common ideas, 53; a changing concept, 88; as guide lines, 99.
Examination, for self-expression, 49; conducted in experimental manner, 220–224; the old-fashioned variety of, 242; to stimulate curiosity, provoke thought, promote creative learning, 248.
Experimentation, need of, 97; in teaching history, 133; dangerous for conservative, 141; hope of, 142; for point of departure, 171; in administering a test, 231–240.
Extension, quantitative, 105; qualitative, 106.
Facts, and knowledge, 93; absorption of, 157; alone, a denial of true education, 189; smothering central ideas, 193–196; reverence for, 196; reliability of, 223.
Failure of students, 136.
Folkway mind, persistence of, 159.
Forces, meeting of, 107; creating new, 108.
Freedom, in work, 5; to achieve goals, 60; within circles described, 53, 99, 111; in choosing studies within guide lines, 215–220; in experimentation in a great university, 220.
French, teaching by a university professor, 90; and lesson learning, 123; and school marks, 138; in secondary school, 211–213.
Fundaments, basic in mental testing, 149; reappearance of, 160.

Gifted children, opportunity of, 53, 99, 111; discovery of, 168; and the IQ, 225.
Goals, of achievement projected, 138; winning new, 191.
Grouping, "homogeneous," 52; by ability, 60; and dead lines, 61; A, B, C professors, 64.
Guarantee, in a democracy, 61.
Guidance, a practicing ground for, 37; in terms of central ideas, 57; educational, 69; in challenge of French verb, 90; through special contribution, 91; through lecture, 135; on basis of directing study, 136; in choice of studies in secondary school, 215–218.
Guide lines, as principles, 12–26; illustrated in key lines, 20–29; casting up, 35; finding central ideas, 55 ff.; in terms of irregular verb, 85; in English unit, 98.

History, a cooperative challenge with English, 104; meaning in terms of forces meeting, 108; building a mind expectant of change, 109; a vigorous citizen-

ship, 110; an experiment in university teaching of, 132–137; status in early American, 175–178; in secondary school, 211–213.
Home study, in relation to contract plan, 32.
Hughes, William Hardin, on intelligence scores and prediction, 200.
Human nature, current ideas about, 142; results attributed to, 158; racial homogeneity in, 183; Sandburg's zoo, 186.
Hunting pattern, basis of research, 15.

Ideals, projected for individual, 174; changing, 175; conflict of, 178; discovering individual through, 180; of a world without war as without typhoid, 186; and the practical, 248.
Imagination, and the engineer, 159; kindled by creative effort, 169.
Impulses, fundamental, 15; operating in elementary education, 161.
Individual, the self-discovering, 173; in relation to ideals of nation, 173–180; in feudal days, 180; labelled and damned, 182; not discovered in status, 185; is what he becomes, 190; a center of creative energy, 191; indeterminate by heredity, 194; means of predicting, 196–200.
Individuality, definition of, 39; practicing ground for, 98 ff.; expressed in freedom in work, 127; discovering the individual, Chapter IV; rests upon recognition of differences, 188.
Indoctrination, filling-station methods, 58; by note-taking methods, 120.
Industry, and its own skills, 79.
Initiative, practicing ground for, 20; through guide lines, 21; in directing study, 35; by means of realizations, 40; in contract plan, 53; illustrated in choices made, 99; cultivated in full release of powers in study, 111; release of, 172.
Instincts, data or hypotheses, 147; man includes, 187.
Integration, of learning units, 53, 99, 111; as opposed to segregation, 209.
Intelligence, popular notions about, 143; innate in what sense, 144; in relation to creative effort, 145; definitions of, 146; quotient, 150; high or low level of, 151; criteria of, 158; meaning of reasoning, 165; determined by response, 166; difficulty in defining, 168; improvement of, 170; scores and prediction, 201; quotients change, 208.

James, William, chapter on reasoning as basis of mental testing, 165.
Junior High School, an experiment in, 75; as a challenge, 163; in relation to senior high and college, 210–213.

Labelitis, nature of, 70
Laboratory, procedure in general science, 75; in contract plan, 111; in history, 133.
Latin, *Bellum Helveticum* way, 74; in secondary school, 211–213.
Learning, and motivation, 18; unit of, 28; integrated, 53 ff.; through organizing principles, 55; inductively in general science, 75; integrated in *Ivanhoe*, 98; and the curriculum, 189; direct, 233, 241.
Lecture, a definition, 120; directed to creative learning, 133–135; in a new focus, 134.
Lesson, a survival, 10; attitude toward, 72; replacing the, 111; in contrast, 115; lesson-learning, 122; hearing, 130; as inhibition. 156.

Liberal, menace of reminiscent, 175.

Liberty, under the law, 5, 6; initiating freedom in work, 20–30; as freedom in work, 30; to achieve goals, 61; learning, life, and law, 190; is achievement, 191; in choosing studies, 215–218.

Magic, of statisticians, 197.

Marks, differentiated, 54; electing, 137; made significant, 138; registrar's currency, 184; and college entrance, 199.

Mastery, absolute and relative, 27 ff.; a continuing, 62; by extension of central idea, 82; cutting sequence in, 87; of central idea, 88; of something, 103; condition of grades, 137; establishing scales for, 229.

Mathematics, illustrated contract in, 52; guide-line principles in geometry, 56; integrated unit, 54; third grade arithmetic in a model school, 128–131; danger in a little mathematics, 140; converting scores into numbers, 147; of variability in testing program, 193–197; in secondary school, 211–217; method of proof in geometry, 246.

Measurement, basic ideas in, 139; what a test measures, 147; of quantities, 193; is relative, 223; what is measured? 227; depends on scales, 229.

Mentality, judging, 155; and experience, 167; fixed and unalterable according to absolutists, 186; conditions of, 209.

Mill, J. S., on human nature, 142.

Miller, W. S., on differences of children with identical intelligence test scores, 208.

Mind, a problem-solving organization, 168; nature of, 221–224.

Mind-set, acquisition of, 72; through negative inhibition, 87.

"Model School," a visit to a, 131–135.

Moral hazard, taking the, 65.

Morrison, H. C., stages of learning, 32; on catching central idea, 240.

Movement, problem-raising, 32; directing-study, 32; development of, 33–36; illustration of, 37 ff.; unifying, 44; socializing process, 47–49.

Opinion, emotionalized by accident, 196; concerning measurement of intelligence, 224.

Orientation, orienting orienters, 1; to challenge as problem-solving, 36; to present attainment, 96.

Originality, a test of, 155; of non-educated, 185.

Otto, M. C., on man's equipment, 141; speaking of three attitudes toward individual, 186.

Overview, in relation to creative thinking, 33; unproductive use of, 157.

Participation, in conference, 41; made possible by guide lines, 69; basis laid in subject matter for, 99; by departments, 103; of student in research, 134; creative aspect of, 140; impeded by system of life, 180.

Partnership, basis laid for, 99, 123; in research, 136.

Performance, a means, 67; a dawdling, 105; geared up, 137; versus mastery, 240.

Personality, expressed in corporate life, 3–5; in self-expression, 8; out of recognition of differences, 16; in opportunity for unique contribution, 23–28; created by meeting of differences, 39; through contract plan, 101, 115; through release of initiative, 172; traits, 207–209.

Philosophy, and method, 140; need of, 169; for America, 181; a

sketch in three directions, 186–192; and the dream, 248.
Plantagenet World, a picture of, 98; through *Ivanhoe*, 99; illustrating integrated contract, 100; approached through English and history, 103.
Potentiality, releasing, 62; under a new scientific humanism, 96; demonstrated, 137.
Prediction, by use of correlation statistics, 195–196; criteria of, 199–200; value of "norms" in, 200; based on items of battery tests, 204–208; in realm of mental phenomena, 225.
Principles, unifying, 12; guideline, 56; comprehending, 85; disclosed in history, 134.
Probability, theory of, 148; applied to prediction, 193–198.
Problem-solving, situations calling for, 82; mind as problem-solving organization, 168.
Process, and product, 10–13; directing the procedure in, 37–48; directed creatively, 81; related to lecture, 135; of achieving, 135.
Product, and process, 10–13; reproduction of finished, 96.
Prohibition, a challenge on, 30–50.

Question, a Robinson type, 18; initiation of challenge, 36; as a factor in creative learning, 123.

Realization, an attack of, 132; in relation to truth, 188.
Reavis, W. C., on pupil adjustment, 203–208.
Recitation, working up to productive, 45; with books closed, 119; the old way, 121.
Recognition, in relation to mastery, 17; and appreciation of special production, 20–30; of individual flair, 101.
Relating, act of, 25; process of, 157; making suitable, 161; the act of creating, 163; in relation to imagination, 165.
Relativity, form of function in, 223–225.
Responsibility, pupil, 114; of critic, 118; for student success, 136; in choosing studies, 218–220.
Results, sharing, 88; of pursuit of studies, 94; of conventional practices, 97; cooperative, 100; quantitative, 104; securing cooperative, 112; creative, 115; objective and verifiable, 236–239.
Reviews, come to life, 66.
Routine, bombardment of, 159; effect of, 180.
Rumpelstiltskin, creatively produced, 124.
Russell, Bertrand, on the new discipline, 6; ornamental education, 182; on ornamental and utilitarian education, 182.

Scales, nature of, 7, 8; and measurement, 139; defects of, 147; scores to, 159; and dizzy arithmetic, 193–196.
Science, general, 75; nature of approach to, 111; and the jungle of mystery, 145; in relation to insight, 179; teaching of science in relation to individual, 194; in secondary education, 211–217; vulgarization of, 221–222; a program of attention to crises, 228; utilized to refine common sense, 229.
Scientific method, criteria, 139; and far-flung horizons, 141; and popular opinion, 150; two pillars of, 160; both simplifies and opens up new problems, 208; non-impersonality of, 222.
Scores, treated as numbers, 147; hypnotized by, 196; analysis of, 204–208; smoothing and relieving the, 227.
Sectioning, by ability, 188.
Security, in changing order, 17; in

achieving results, 28; through participation, 171.
Segregation, unnecessary in guideline work, 26; by ability grouping, 52; of professors and teachers, 64; on basis of ability, 96.
Self, and its marriageable relations, 4; tied into a growing philosophy, 172; as determinant in discovery of individual, 173; realization, 191.
Self-activity, organizing principles for, 20; inhibiting, 72; provision for, 55, 99, 111; in the new school, 124; purposeful, 161.
Self-confidence, creating, 7.
Self-discovering, in process of becoming, 51; in relation to nutrition, 144; in terms of will to become, 190.
Sharing results, in extended challenge, 88.
Shearcroft, W. F. F., meaning of measurement, 223–224.
Similarities, achieving, 2; as common multiples, 20–30; based on theory of instincts, 187.
Situation-Test, from Strasheim, 152.
Social customs, fundamental, 187.
Socialization, process of, 16 ff.; and individualization, 47; need of, 59; way of, 113; in accord with American ideals, 181.
Specialization, sharing results, 48; within a described circle, 90; in subjects, 165.
Spelling, caught up in a creative challenge, 12–14.
Standardization, scope of, 5–9; mania for, 146; of information in relation to status, 182; of intangibles, 188; of results, 192; limitations of, 228–229.
Statistics, and confusion, 192; and meaning, 193–209; acting as a drug, 197; value in education, 200.
Status, persistence of, 145; fixing, 150; surviving forms of, 181–183.
Stereotype, "lessons," 29; in form of supervised study, 37; covering the ground, 130; bell-shaped curve, 139; as average, generic child, 192; in form of "true-false" test, 227.
Strasheim, J. J., on mental testing, 148; his situation-tests, 152.
Systems, of life compared, 2–5; conflicts in, 172; of philosophy, 186.

Teacher, and pupil power, 12; as artist, 20; according to Comenius, 120; the making of the new, 131; as counsellor, 135; as consulting expert, 136.
Teaching, in university, 132; and research, 133; by situations instead of subject matter, 160; the challenge of, 229; the art and the job of, 241.
Technology, extent of, 2; in relation to craftsmanship, 197; old ideas supporting a marvelous, 118; due to mathematics, 228.
Temperament, basis of differences, 188; *Downey Individual Will Temperament Profile*, 206; facts projected on background of, 224.
Temptation, a prescribed, 34; to unawakened intelligence, 60; and to awakened intelligence, 96.
Terman, L. M., what intelligence tests measure, 146; Terman group test analyzed, 204.
Testing, for mastery, 44; in terms of experimental approach, 76; new methods of, 122; and pessimistic conclusions, 133; and development of skepticism, 145; construction of tests, 147; excessive, 163; in terms of James's psychology, 165; in real situations, 166; factors involved, 167; and the higher powers of mind, 168; mathematics of, 195–196; and survival, 199–202; inferences deduced from, 229; and

creative learning, a distinction, 247.

Tests, construction of, 149; built in sequence of materials, 150; true-false, 226; in relation to psychological method, 231–240; construction of new type test in grammar, 235–237; validity and reliability of new tests, 240.

Thorndike, E. L., on treating scores as numbers, 147.

Units of learning, comprehensive and challenging, 10–18; integrated, 52 ff.; illustrated, 81, 85.

Unity, emerging, 78; out of teaching and research, 134; envisaged in American ideals, 181.

University, teaching in the, 133; a procedure by contract plan in, 137.

Value, relative, 140; personal, 152.

Wells, H. G., on college degrees, 184.

Wyndham, Lewis, on scientific vulgarization, 222.

Youth, a catalogue of resources of, 179.

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